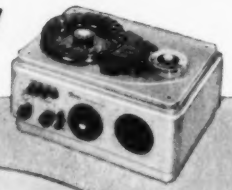
MODERN PLASTICS

AUGUST 1950

It pays to use your custom molder's know-how

. . . for Lowering Parts and Handling Costs

No. 20 in a Series on Plastics Skill at Work . . .



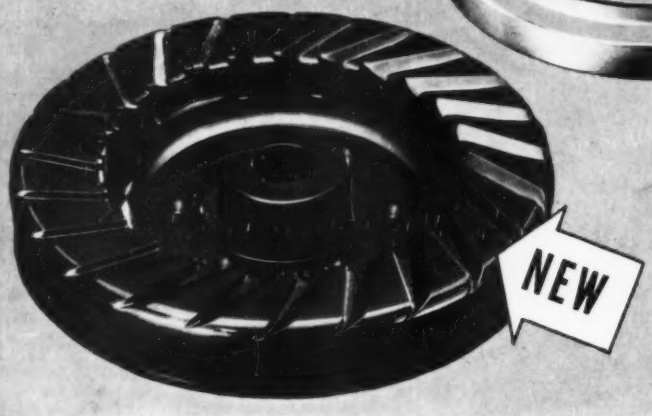
PROJECT: Removable drum and spool holder for dictation-transcription-intercom unit.

CUSTOMER: Crescent Industries, Inc., Chicago.

MOLDER: General Die Mold Co.

MATERIAL: Asbestos-filled Durez black phenolic plastic.

CAST METAL TURNTABLE required numerous handling operations. It had the dual disadvantage of high cost and an excessive rate of rejects.



DUREZ PLASTICS UNIT costs much less, meets rigid specifications on finish, weight, dimensional stability. Customer reports "No rejects."

Custom molders of plastics offer you a lot more than specialized plant facilities. Their engineering know-how, production skill, and grasp of design are practical talents that dovetail with those of your own staff. Everywhere you look are examples showing how well it pays to use these services in full.

In this one the producer of "Steno" wire-recording dictation, transcription and office intercom unit solved a knotty parts cost problem. A metal turntable and wire spool holder involved repeated handling in machining, finishing and assembly. Rejects were excessive.

Enter the molder—with constructive ideas on the designs of both the part and the mold, and recommendations for a Durez material best suited to the job. Because the recording wire is very fine (.004"), the mechanism must always start and stop with unvarying tension. This is assured by the perfectly balanced 320-gram turntable of molded Durez, which serves as a friction clutch.

Molded with .003" tolerance on its full diameter, the Durez part has exceptional dimensional stability under varying atmospheric conditions. Its lustrous, satin-smooth finish is molded in, not added — it costs 30% less installed than the part replaced — and customer rejects are nil.

When you want to act on an idea, call on your molder's experience. Durez engineers will work with you and him.

Our monthly "Durez Plastics News" contains many useful ideas. May we place you on the list? Durez Plastics & Chemicals, Inc. 128 Walck Rd., N. Tonawanda, N. Y.

DUREZ

PHENOLIC RESINS

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

PHENOLIC PLASTICS THAT FIT THE JOB

Behold the GENIE PLANTER... Smart Two-in-one Garden Box and Water Reserve... molded of *Catalin* STYRENE

Through the ingenuity of the Harrison Company, of Long Island City, N. Y. and by their use of Catalin Styrene, the old fashioned flower pot now finds itself transformed into a very enchanting, dramatically colorful and highly practical indoor garden setting.

Strikingly refreshing in design—and completely new in principle—the Genie Planter holds the secret to flourishing planthood . . . it features a sealed-in reservoir that stores water and feeds it to the roots as wanted, thus reducing one's care from daily attention to a once-a-week clean, quick chore.

Here, also, in the choice of Catalin Styrene, the manufacturer found the perfect material. It is impervious to the action of soil chemicals and water immersion.

Catalin Styrene is extensively versatile—so capable of bringing new life and rich color at low cost to so many modern products that we, of the Catalin Service Staff, solicit the opportunity to detail its advantages to both molder and manufacturer. Inquiries invited.

CATALIN CORPORATION OF AMERICA

ONE PARK AVE., NEW YORK 16, N.Y.

MODERN PLASTICS*

VOLUME 27 AUGUST 1950 NUMBER 12

CONTENTS

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Another new development using

B. F. Goodrich Chemical Company *raw materials*

Welting extruded by Auburn Button Works, Inc., Auburn, N. Y.

Seating Beauty!

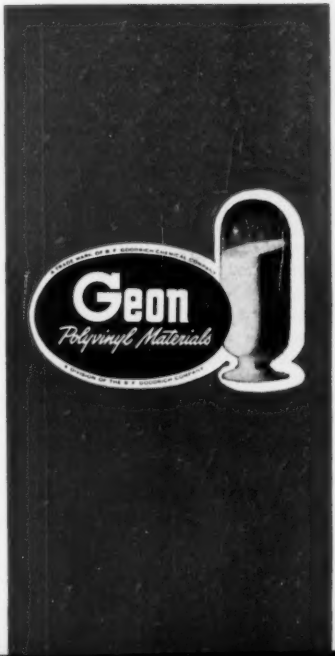
COSTS TRIMMED TOO, WITH GEON

THESE covers take a seat right up front when it comes to good looks—and in durability and cost-savings, too. One of the big helps to their success is the welting used as a binding. It's extruded from Geon plastic.

Just see the advantages that Geon gives this welting! Better abrasion resistance than commonly used coated fabric binding. Great seam strength. Good flexibility at high and low temperatures. Add to that Geon's exceptional resistance to chemicals, solvents, oils, fats, waxes, water and weather.

When it comes to cost-savings, think of these. The extruded welting combines both bead and leg. In conventional bindings, those are made from at least two different materials such as coated fabric, cloth, paper, etc. Welting of Geon can be easily handled and stitched into seat cover material on conventional sewing machines. And Geon materials can be supplied in a range of brilliant or delicate, long-lasting colors.

Versatile Geon polyvinyl materials can be extruded, calendered, cast into sheets or film, or used for coating. Products of Geon can be made resistant to heat, cold, aging, weather and wear. Geon's versatility may start an idea rolling for you. We'll gladly help you work it out. Send for technical bulletins. Please address Dept. GA-8, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.



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EDITORIAL

Plastics Supply—and the Future

Not so long ago, a million-dollar molding plant was a relatively huge proposition; this year one midwestern molder is spending over a million dollars in plant expansion alone!

Two years ago, a 32-oz. injection press was a juggernaut; by the end of this year there will be in operation upwards of 30 new presses capable of handling shots of from 60 to 80 oz.—and several more of even larger capacity. The first 200-oz. injection press went into operation in a New Jersey plant in June.

In only two years, maximum average compression press capacity has moved up from around 14 to 80 lb. per shot. Extruders regularly handling 400 lb. an hour are now in operation.

In the laminate field, recent expansion has been steady; one of the biggest makers of decorative laminates is putting $7 million into a new plant. In film and sheeting, the capital investment in plant expansion now also runs in million-dollar units, that being the price of a modern calender and its accessories.

Capital investment in plant is directly related to volume of material used and working capital involved. An injection-molded piece weighing 52 oz., running in a 60-oz. machine on a 50-sec. cycle, and figured on the basis of a 20-hr. day, will use up to 4600 lb. of thermoplastic material a day. That's just one job (and not an exceptionally big one by today's standards) on one machine! Material quantities used by big new equipment in other production operations are proportionate —in compression molding, laminating, extrusion, and calendering.

Market-wise, the plastics industry picture is in balance with investment and material-use trends. A refrigerator maker who used 4 lb. of plastics per box in 1940 and 24 lb. per box in 1950, will use 30 lb. per box in his '51 models. Add other home appliances, automobiles, television, industrial-machinery components, housewares, toys, furnishings, packaging, and a dozen other end-use brackets, in which the trend is also toward the increased use of plastics, and the whole picture rounds out.

No wonder literally every plastic is in limited supply today. No wonder such great expansion is in progress in plastics material-making facilities. No wonder the industry is presently worried about benzol!

In view of the changing shape and broadening scope of the industry, the lead article in our Plastiscope department this month is recommended reading. (See page 154). As pointed out therein, present shortages give no cause for fear for the long pull. The needs of this industry for materials will be met as have been its needs for equipment and for capital. The markets for plastics will continue to dictate those needs; those markets never looked better. The brains devoted to technical development in this industry and to the creation of new facilities are second to none. The spirit and character of this industry's management which has created present expansion assures the future.

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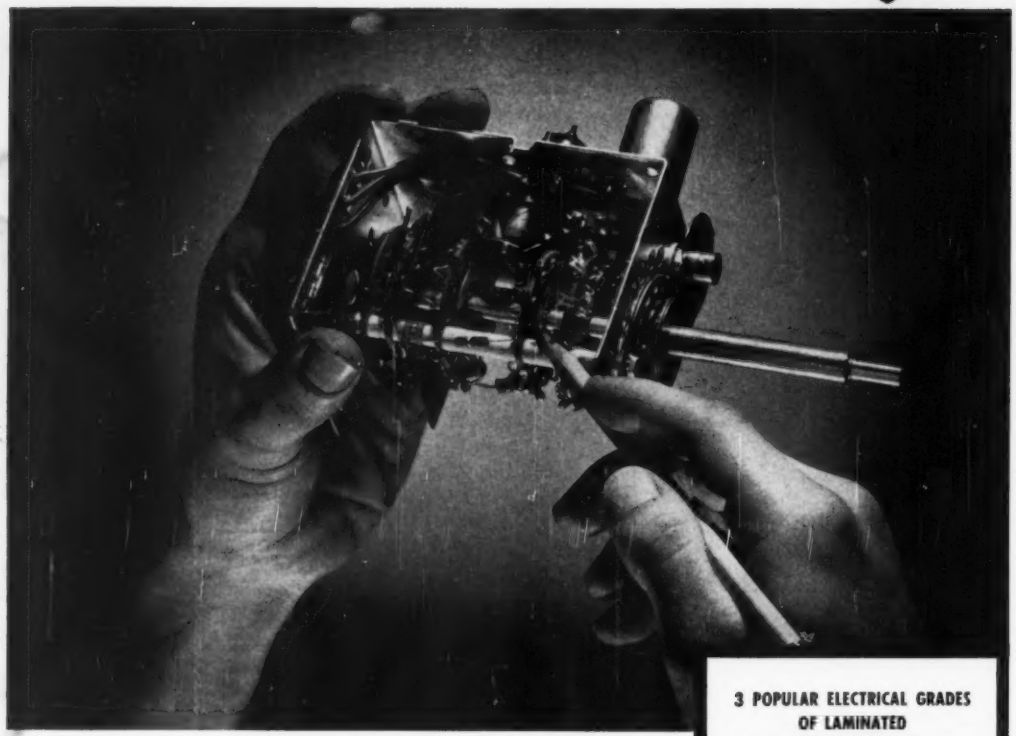
INSUROK T-725 Retains Its Properties ...even AFTER SANDING



That's why it is used in this Tarzian Tuner . . . standard in TV sets of 17 leading manufacturers

Most laminated insulation that can be punched depends largely upon high-resin content surface for the maintenance of its electrical properties under conditions of varying humidity. When sanded to close tolerances, this surface is removed—seriously impairing the electrical behavior of the material.

INSUROK T-725, however, is uniformly top-quality insulation throughout the sheet. Sand it and it is still better than most unsanded materials.

This is one of the reasons why Oak Manufacturing Company selected INSUROK T-725 for the components it makes for Sarkes Tarzian, who supplies tuning heads to 17 leading TV manufacturers. Investigate INSUROK T-725 for your product. Full information upon request.

3 POPULAR ELECTRICAL GRADES OF LAMINATED

INSUROK

T-725 An outstanding paper-base laminate that can be hot-punched to intricate shapes. Has excellent electrical and physical properties, is stable under moisture and heat.

T-800 Has unmatched electrical properties, yet punches with ease. It has a sensational ability to retain these properties in high humidity.

T-812 A further development in the electrical sheet field with insulation resistance on the order of T-800 and mechanical properties comparable to T-725.

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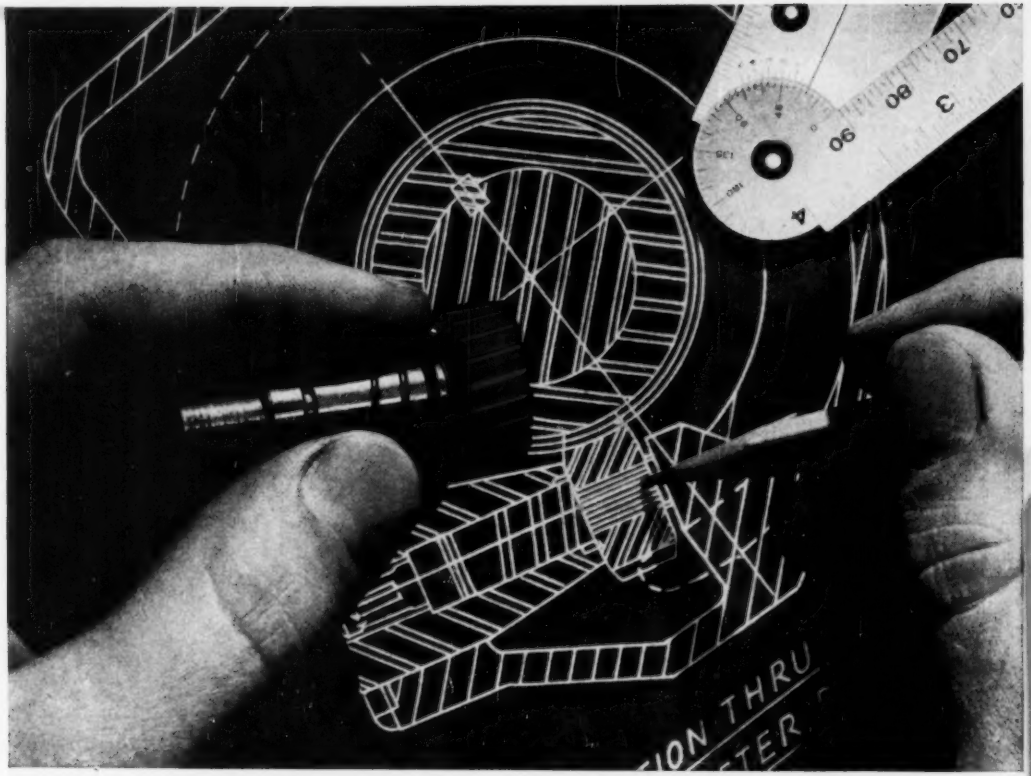
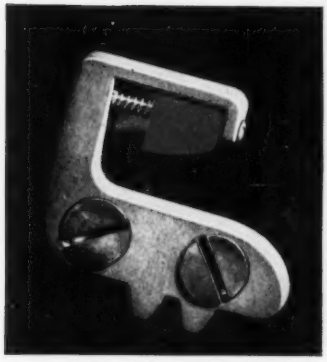


NYLON SPEEDOMETER GEAR ON '50 FORD REGISTERS 50% CUT IN PRODUCTION COSTS

Injection-molded to exacting tolerances in a single operation



Nylon door-lock wedge on 1950 Ford. Provides superior abrasion-resistance, high resistance to repeated impact of door slamming. Costs less than materials previously used. (Nylon part molded by Standard Products Co., St. Clair, Mich.)

A five-step operation was formerly required to produce this gear to drive the Ford speedometer cable. Now, in a single operation, Ford injection-molds nylon gears, complete with tooth identification, directly on the shaft. It is estimated that use of Du Pont nylon has reduced the man-hours needed to produce this gear to one-half the former figure—a 50% saving in over-all production cost!

Nylon gears perform better, too. Ford finds that closer tolerances can be held more economically. Tolerances for the nylon gear are ±0.001″ for pitch diameter, and ± 0.002″ for O.D. Too, nylon has superior wear- and abrasion-resistance. Rugged tests equivalent to 100,000 miles of operation at 80 m.p.h. proved nylon's ability to stand up without visible wear.

Nylon's outstanding advantages are saving money and improving performance in a wide variety of industrial and commercial applications. Its properties may well help you, too. For free literature on nylon and other Du Pont plastics, write today. E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Plastics Sales Offices: 350 Fifth Avenue, New York 1, N. Y.; 7 S. Dearborn Street, Chicago 3, Ill.; 845 E. 60th Street, Los Angeles, Calif.

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Has what it takes to please consumers. These nationally known manufacturers are using Forticel for their quality trade marked products.

All the famous name fountain pens, millions of telephone housings and parts for calculating machines, typewriters, carrying containers, pistol grips and many other products benefit from the properties of this prime cellulosic plastic.

Maybe you need brilliant mold finish . . . excellent moldability, machinability, and toughness . . . superior dimensional stability . . . freedom from odor—Forticel can provide them.

So, if *you* have a demanding plastics application, get the facts about Forticel from your Celanese representative. There's a difference in its performance. Celanese Corporation of America, Plastics Division, Dept. 1-H, 180 Madison Avenue, New York 16, N. Y. In Canada, Canadian Cellulose Products Limited, Montreal and Toronto.

Celanese*

PLASTICS

*Reg. U. S. Pat. Off.

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"Cubee" does a complete job . . . when you use our services you get the benefit of the *entire* organization working on your problem — designers, die makers, molding machine operators — everyone. You see, we have all the services available to you to help you solve your problems.

Five of the key people here have a total of more than 75 years of experience in this business — and remember, this is a relatively new field. That's a lot of know-how — and it's yours for the asking. Let "Cubee" take over *your* plastics problems — from Start to Finish.

Q-B Says:

"Cubee solves your plastics puzzle,
And he does it in a hurry
Just toss the job in Cubee's lap
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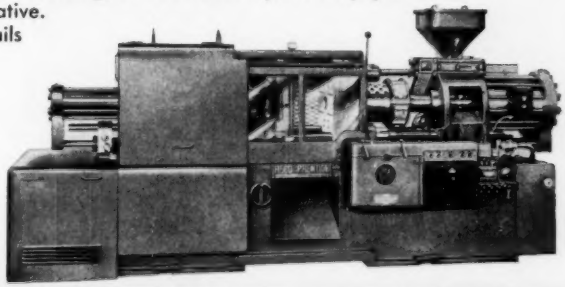
Part of an installation of 34 Reed-Prentice Plastic Injection machines at O. & M. Kleeman, Ltd., London

REED-PRENTICE IN GREAT BRITAIN

British molders have one thing in common with other molders throughout the world. They, too, rely largely on versatile Reed-Prentice injection molding machines for continuous and economical production of attractive plastic articles. There are now over 170 Reed-Prentice molding machines located in England alone. Thirty-four of these injection presses operate in the modern plant of O. & M. Kleeman, Ltd. in London, and comprise Great Britain's largest installation of Reed-Prentice plastic injection units.

When you are considering plastic molding, or additional injection equipment, call in a Reed-Prentice representative. He will gladly go over details with you of the complete line of 2 to 60 oz. capacity machines. Write Dept. D. for illustrated booklet.



Reed-Prentice 10D-8 oz. Injection Molding machine

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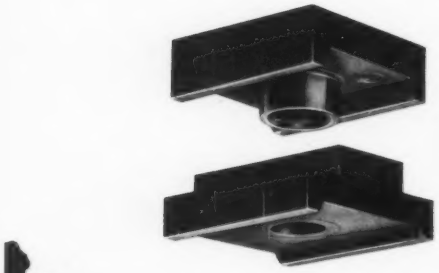

OVER PEOPLE'S HEADS FOR MORE THAN TEN YEARS

For 14 years, the General Industries Co., has been molding insulator blocks for overhead cranes manufactured by the American MonoRail Company. Almost from the start, General Industries has used Rogers RM-9725 exclusively. A dependable molder using a dependable material.

Rogers RM-9725 is a phenolic molding board uniquely qualified for responsible parts. It offers excellent dielectric qualities, in combination with high impact and flexural strengths. It molds in the same molds as general purpose materials. Quality control assures uniformity, batch after batch, year after year.

Get the whole story on Rogers high strength materials. Write for our catalog or ask to have a technical representative call.

Write Department P

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Mixers

Give You Every Advantage for Quick, Thorough, Economical Mixing

The Sturtevant Dry-Batch Mixer is an efficient rotating drum-type machine for mixing various substances together into a homogeneous and inseparable whole, every part of which presents the same analysis. The substances may be of different weights and physical properties, and may be either dry, partly dry, or a mixture of both.

Because of the unique design of its mixing chamber, and the 4-way mixing action which brings two or more substances together, the Sturtevant Dry-Batch Mixer does a more rapid mixing job than other machines and, at the same time, it is complete and thorough in every particular.

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- 5 models . . . a size for every mixing job . . . smallest size mixes up to 7½ tons per hour . . . largest size up to 75 tons per hour.

injection molding machines

DE MATTIA

—the standard of MOLDING EFFICIENCY

The De Mattia Model C-1, illustrated, incorporates the ultimate in design and performance in injection molding machines. Exceptionally heavy tension members, high mold clamping pressure and uniform hydraulic pressure on the entire die face are just a few of the many De Mattia features that increase molding efficiency. Like all De Mattia equipment, Model C-1 is ruggedly constructed to provide long service in continuous use — the kind of service that has made the name De Mattia a standard for reliability throughout the industry.

DE MATTIA HORIZONTAL MODEL C-1 SPECIFICATIONS

Material per Injection — 12 ozs. • Plasticized Material per hour — 130 lbs. • Feed Hopper Capacity — 60 lbs. • Injection Piston Diameter — 2¾" • Injection Piston Stroke — 11½" • Hydraulic Injection Cylinder Bore — 13" • Pressure on Material — 22,500 PSI • Mold Closing Pressure — 400 Tons • Max. Mold Size — 18" x 25" • Max. Daylight — 30" • Min. Die Space — 6" • Max. Stroke — 24" • Oil Pump Capacity — 60 GPM @ 1000 PSI, Max. • Motor — 30 HP • Injection Stroke Time, for Filling Mold — 3.0 Secs. • Speed of Injection Piston, Forward — 120" per Min. • Heating Cylinder — 13,000 Watts • Height of Machine, Overall — 72" • Floor Space Required — 172" x 42" • Approx. Weight — 10 Tons.

SEND FOR NEW DE MATTIA CATALOG

It contains complete information and specifications on De Mattia Horizontal and Vertical Molding Machines and De Mattia Scrap Grinders.

MOLDING PRESSES • SCRAP GRINDERS • MOLD MAKING

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Want a come-on . . . or a follow-through?

Do you go for a fast pitch—or do you want performance? It all depends on what you want for your money.

There are some plastics moulders who'll ignore their costs because you're a good guy (and they're hungry). Some will take shortcuts in mould-making—or grab your job as a fill-in for any price they can get.

Put your job in this kind of shop, and what have you got? A temporary price advantage on one or two runs, yes, maybe. **But have you got a creative, dependable, permanent supplier?** One who'll deliver longe-range economies by producing good moulds for more efficient production? One who'll improve your product designwise? One who'll meet your shipping schedules year after year from the same soundly-engineered mould?

Temporary price-shaving just plain isn't worth what it can cost. Careful plastics buyers must watch costs, we know. **We say, "Ask for bids on your jobs. That's good business. But insist that all your bidders know their costs—that they are all completely equipped to handle your job from design to final finish—that they've all earned a name for knowing plastics!"**

There are a lot of moulders like this. We're one of them. And we'd like to talk plastics with you. We'll answer your inquiries promptly.

Kurz-Kasch

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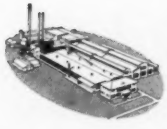

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PLASTICS

OUR TWENTIETH CENTURY JACK-OF-ALL-TRADES!

They are with you from morning to night—smoothing your way. They improve on Nature at every turn, which is by no means any criticism of Mother Nature. She never planned a tree to be a harmonica, or a silk worm to make a stocking.

The plastics which are our business to mold for you were definitely planned for their modern applications. Like modern medicine, however, they should be taken under prescription of a competent consultant, someone who has been through the mill for a long enough time to have become thoroughly familiar with their weaknesses as well as their strengths.

That is why we, as custom molders, exist and are busy. We have a long list of well-known business concerns who prefer that we take the beating that inevitably comes to a plastic molder, who use us as their molding department, and who not only like the arrangement but are making money under it. Most certainly we make money working that way. You can't be in business thirty years and lose money consistently.

For custom molding of almost all kinds of Plastics by almost all methods, write or telephone us. People have been doing just this since 1921.

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BOONTON MOLDING COMPANY

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they're molded from Koppers Polystyrene

● Eye-catching beauty combines with functional utility to make Max Factor's cosmetic line an achievement in packaging. The lustrous, white-and-gold containers, individually styled for each Max Factor product, are molded from Koppers Polystyrene 31.

Polystyrene's unusual combination of qualities make it the ideal material for packaging projects. Opaque white Polystyrene makes a container that attracts attention on any display counter . . . gives an instant impression of real quality.

Polystyrene can be molded into almost any shape, thus maintaining individuality in a complete line of products. It is free of odor—highly important where the delicate scents of cosmetics are involved. Polystyrene's low cost—both from a material and a molding standpoint—meets one of the first requirements of a perfect package.

If you have a problem in packaging, take advantage of the extra product appeal, lower material cost and lower molding cost that result from using Perfected Polystyrenes. Mail the coupon for a copy of "Koppers 1950 Polystyrenes."

Molded by Eldon Manufacturing Company, Los Angeles, Calif., the distinctive white-and-gold Max Factor packages are made of opaque Koppers Polystyrene 31. The closure band on the new "World of Beauty" lotion package is molded from crystal Koppers Polystyrene 31. Manufacturer: Max Factor, Hollywood, Calif.

KOPPERS POLYSTYRENE
gives you all these advantages

- **Low cost**
- **Light weight—more pieces per pound**
- **Excellent dimensional stability**
- **Excellent electrical properties**
- **Choice of heat distortion temperature ranges**
- **Good chemical and moisture resistance**
- **Tasteless and odorless**
- **Unlimited color range**

Koppers *Perfected* **Plastics**

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Company.....

Address.....

City.....State.....

HERE IS A 3-STEP PLAN for cutting processing costs

1

EXPLORE BY EXPERIMENT *the possibilities of new processing techniques.*

The Farrel-Birmingham process-testing laboratory provides the ideal spot for conducting such experiments.

Here, there are numerous pieces of modern equipment in both laboratory and production sizes. This equipment is designed to help work out processing techniques *before* beginning full-scale production. Interchangeable working elements for these machines, and a wide range of speeds and pressures, broaden the scope of their use, making a great variety of tests possible.

Farrel-Birmingham offers the private use of this laboratory and the assistance of its engineering staff, without obligation.

View of Farrel-Birmingham Process-testing Laboratory

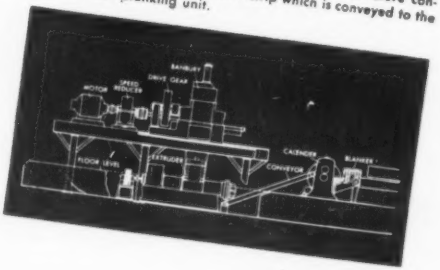
2

ENGINEER YOUR PLANT LAYOUT *to provide an efficient, continuous flow of production.*

For many years, Farrel-Birmingham has made a specialty of engineering complete processing setups. Developed from start to finish by company engineers, each of these layouts is composed of production machines *matched in capacity* to prevent the "choking" or "starving" of succeeding units. Production flows without costly interruptions and with manual aid and supervision reduced to a minimum.

The Farrel-Birmingham *Engineering Planning Division* is staffed by men with a background of many years of experience in solving processing problems for the rubber and plastics industries.

Setup especially designed for the production of blanks from which phonograph records are made. In operation the 12" extruder receives stock directly after it has been processed in a Banbury mixer. The extruder, which requires no operator, handles the full capacity of the Banbury. The stock is thoroughly worked by screw action under close temperature control, and the die head extrudes a strip which is conveyed to the calender and blanking unit.



3

SELECT EQUIPMENT *to suit needs exactly.*

Farrel-Birmingham production units are available in various sizes and with a wide choice of design features to meet specific requirements.

BANBURY MIXERS—First developed for the rubber industry where its use is virtually universal, the Banbury is now widely used with equal efficiency in the production of plastic materials such as phenolic condensation products, cellulose acetates, caseins, synthetic resins, vinyl chloride resins; also asphalt roofing and flooring, linoleum, paints and lacquers.

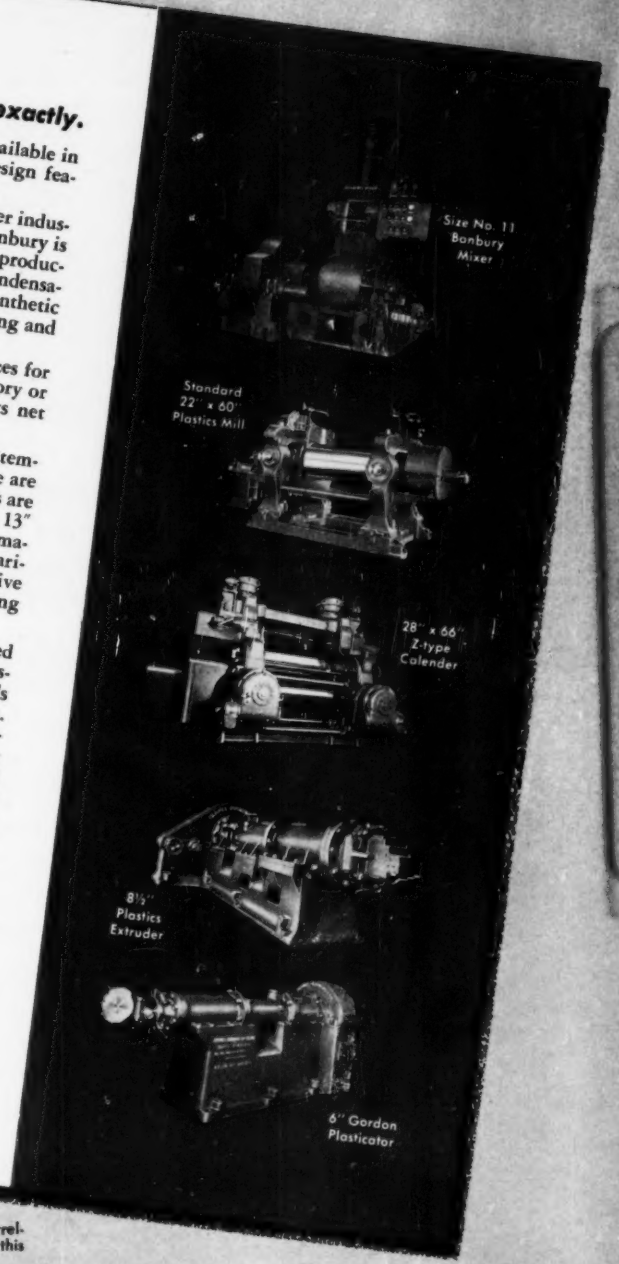
Banbury mixers are made in six standard sizes for processing plastics, from the size B for laboratory or small production work to the No. 11 with its net chamber capacity of 14,940 cubic inches.

MILLS – Farrel-Birmingham mills provide close temperature control and accurate gauge where these are required for processing synthetic materials. Mills are available in a complete range of sizes, from 6″ x 13″ for the laboratory up to 28″ x 84″ heavy duty machines for the factory. For special requirements, variations in design as well as a wide choice of drive arrangements are obtainable, often from existing plans.

CALENDERS—Farrel-Birmingham calenders are designed for the highly specialized work of calendering plastics, a continuous, high-speed operation that demands accurate control of gauge for satisfactory production. From the small laboratory units to the huge production sizes, the physical proportions, materials, type of construction, lubricating system, gearing, special operating features—in fact, every detail is designed to fit the job the calender is built to do. Calenders are available in both Z-type and inverted L-type constructions.

EXTRUDERS—Farrel-Birmingham extruders have "designed-in" features and construction to suit each machine for its particular function. They are built in a range of sizes from 6″ to 20″ for a variety of applications in processing plastics stocks.

Gordon plasticators, which are used for continuous mixing of the various powders or granules that go into numerous thermoplastics, are available in 6″, 8½″, 12″, 15″ and 20″ production sizes and a 3″ laboratory size.



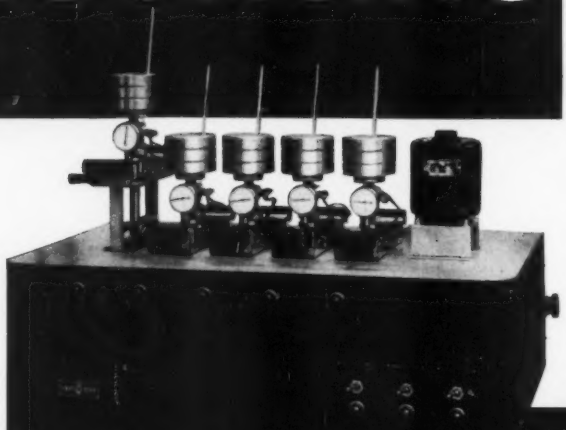
Before you purchase new processing equipment, call in a Farrel-Birmingham engineer. He will be glad to give you the details of this 3-step plan for cutting processing costs.

FARREL-BIRMINGHAM COMPANY, INC. • ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

Farrel-Birmingham

ANNOUNCING



THE NEW OLSEN
5 GANG HEAT DISTORTION TESTER
(Meets ASTM Spec D-648)

A test unit removed—showing the simplicity of construction, and ease with which the technician is able to work with the equipment.

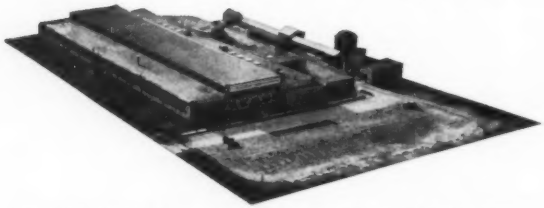
To meet the increasing demand by the Plastics Industry, Tinius Olsen Testing Machine Company has developed the new 5 gang heat distortion machine which provides for 5 tests to be made simultaneously on the same or different materials.

Each of the 5 units is complete within itself—with automatic deformation indicator, thermometer, pilot light, automatic heating controls and cooling system to speed testing. The automatic heating controls raise the temperature 2°C per minute from 25°C to 200°C.

Each of the 5 units will accommodate all specimens from ⅛" x ½" to ½" x ½" under fibre stress of 66 psi or 264 psi.

Great convenience of inserting the specimen has been built into the design of the test units—each is held in place by positive spring clips which may be released for the unit to be lifted. (See left hand unit in illustration above.)

Write today for complete information.



We will be glad to show you our new plant on Easton Road, Willow Grove, Pa. (Suburb of Phila.). Over 100,000 square feet of area all on one floor devoted exclusively to the manufacture of testing and balancing equipment.

TINIUS OLSEN

Testing & Balancing Machines

TINIUS OLSEN
TESTING MACHINE CO.
2050 Easton Rd., Willow Grove, Pa.

THE BUDDHA

AMOS does it again!

Produced for
Alden Plastic Corp.
230 Fifth Ave., N. Y.
Designed by
R. W. Dailey
Amos Eastern
Representative

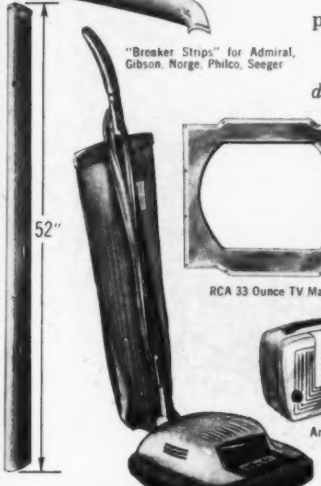
New BUDDHA

"Breaker Strips" for Admiral, Gibson, Norge, Philco, Seeger

A *sparkling new* dispenser for fine cosmetics, jewelry, perfumes! A *lovely re-use* container for playing cards, cigarettes and general decorative use! . . .

Only in *plastics* could such beauty, economy and sales appeal be achieved. And only at *Amos* could be found the experience and painstaking skill to *insure* final perfection.

Why not give YOUR product the benefit of Amos' complete facilities to—*design, engineer, tool, mold* and *finish?* Call Amos . . . Now!



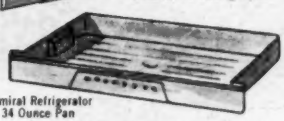
Eureka Vacuum Cleaner

RCA 33 Ounce TV Mask

Arvin Radio

Admiral TV Lens

Admiral TV Tuning Panel



Admiral Refrigerator
34 Ounce Pan

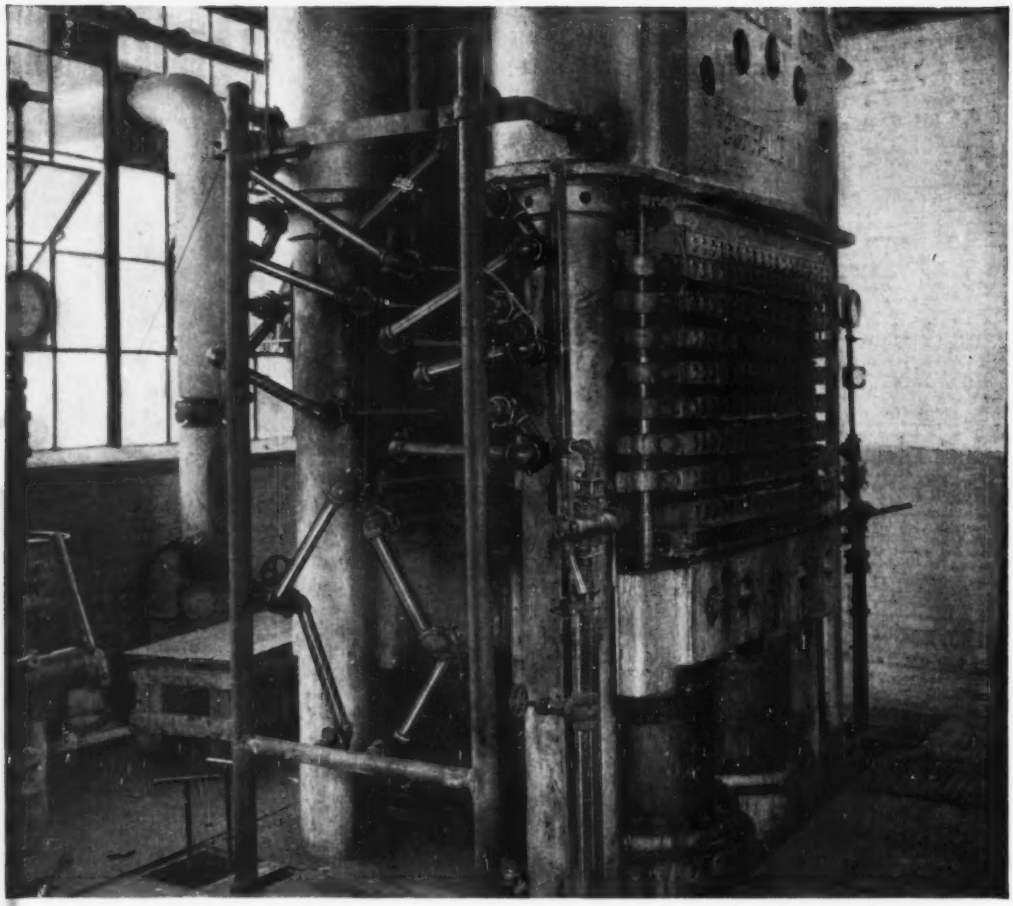
Eversharp Razor Kits

Write for our new 52-page booklet, picturing in full color AMOS facilities—showing many parts and products pioneered in many industries.

Injection Molding Specialists . . .
8 to 120 ounce machine capacity

Amos
MOLDED PLASTICS...
EDINBURG, INDIANA
Offices: NEW YORK, CHICAGO, DETROIT, PHILADELPHIA

Amos' New *Larger* Equipment Molds *Bigger* Parts For Every Industry!



FLUIDS FOR MOVING PARTS ARE CARRIED BY BARCO ROTARY SWIVEL JOINTS

Barco Joints (Rotary Swivel type) are used on this multiple press with outstanding success.

For over forty years, Barco Joints have been serving industry—each year meeting ever-changing problems with constant new development.

In addition, they are used in almost every kind of job requiring *flexible* fluid-conveying systems. By absorbing strain and stress, by compensating for expansion and contraction, Barco joints have proved their value in an infinite variety of applications. Write for full information to Barco Manufacturing Company, 1809I Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.

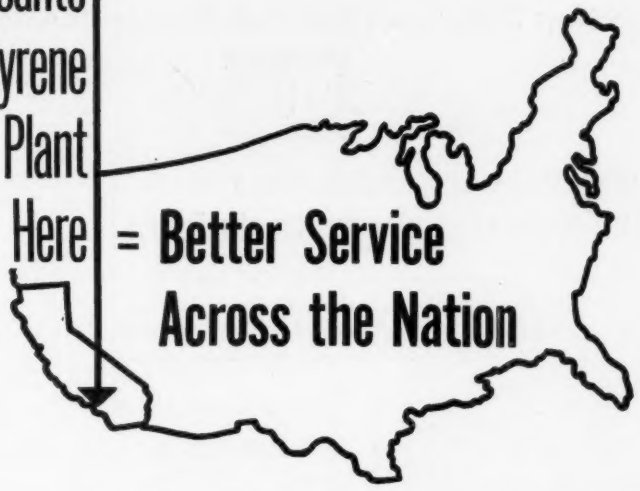
BARCO **FLEXIBLE JOINTS**

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

Not just a swivel joint ...but a combination of a swivel and ball joint with rotary motion and responsive movement through every angle.

"MOVE IN EVERY DIRECTION"

New Monsanto Styrene Plant Here = Better Service Across the Nation



This month, Monsanto's new styrene plant at Long Beach, California, rolls into production . . . assuring molders all over the country of better service, of more speedy and accurate deliveries, on-the-spot technical assistance, and the many other advantages accruing from a multiple materials source. In addition, it brings to Western molders, for the first time, a major source of material.

The new plant at Long Beach, operated by the Western Division, offers the same advantages of quality, service, and dependability you have learned to expect of Monsanto. We're happy to join the West's growing plastics industry, and to thus serve all molders by spreading the benefits of an added materials source. This is but another indication of Monsanto's sincere wish to be of greater service to plastics molders, already exemplified by such activities as the Plastics Merchandiser, the well-known Monsanto Technical Council and the recently introduced Materials Comparator.

Monsanto makes a wide range of plastics, each with its own special advantages you'll want to investigate for your products. Write today for complete information—and use the handy coupon if you'd like to have the material costs-plastics properties Comparator.

MONSANTO
CHEMICALS—PLASTICS

SERVING INDUSTRY...WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY,
Plastics Division, Dept. MPLP32, Springfield 2, Mass.

☐ Please send me, "What Monsanto Plastics Can Do For You."
☐ Please send me the Comparator.

Name & Title _____

Company _____

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City, Zone, State _____

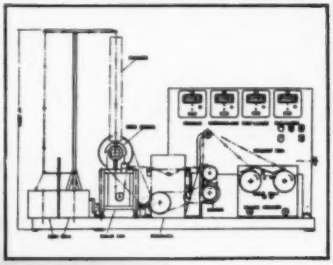
PLASTICS MACHINERY BULLETIN

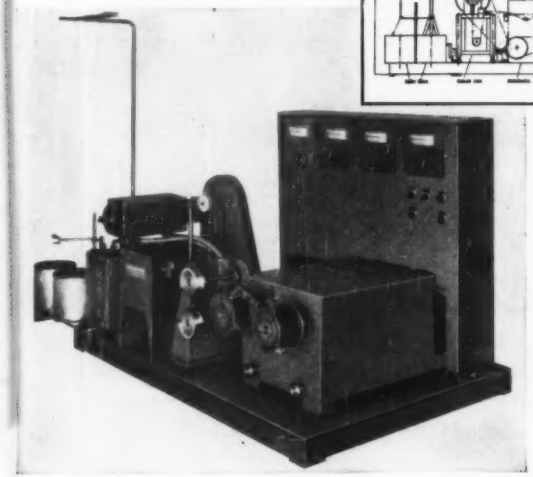
Reporting News and Machine Design Developments

IN BUSINESS TO **NRM** REDUCE YOUR COSTS

Fast, efficient nylon covering for small diameter wire with New NRM Bench Type Nylon Wire Covering Extruder

Shown below are a photo and elevation plan of the NRM 1″ Bench Type *Nylon* Wire Covering Extruder. This new machine is complete and compact, especially designed for covering small diameter (magnet) wires with *nylon* compound. The unit is fast and efficient; covers wire from #24 to #36 B & S gauge up to 1,600 ft. per minute—depending upon wire and covering sizes.





NRM 1″ Bench Type *Nylon* Wire Covering Unit—complete with electrically heated extruder, let-off, cooling tank, spark tester, dual capstan, dual take-up, instrument and control cabinet including all drives and controls. All details and quotations furnished on request. *Write now for full information.*

Another "first" in extrusion! ACETATE AND ACRYLIC POWDER EXTRUSION NOW POSSIBLE WITH NEW NRM TWO-STAGE EXTRUDER

A new NRM two-stage extruder has been proved in tests to dry and extrude pre-blended acetate and acrylic compounds, to be pelletized direct at the die or in a chopper. This means reduced production costs by eliminating the initial compounding and drying steps. The new machine is the first single screw extruder to incorporate colloiding, devolatilizing and extruding features; similar in many respects to standard NRM plastics extruders and is possible to modify certain NRM exising extruders now in the field. Get complete details by writing NRM at Akron, Ohio.

NEWS OF POLYVINYL CHLORIDE SHEETING PRODUCED BY NRM's EXPANDED TUBING METHOD

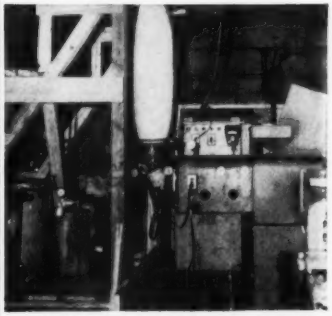
Development well under way; process is now satisfactory for certain markets

Polyvinyl chloride sheeting men have long kept a hopeful eye on the tremendous savings that will become possible through the adaption of standard extruding machines for polyvinyl chloride sheeting. The possible savings in initial machinery is well known.

NRM has perfected expanded tubing dies and screw designs to a point where small gauge (.002″) polyvinyl chloride sheeting is obtainable in acceptable quality from a compound in powdered form. NRM is continuing to explore and develop possibilities of polyvinyl chloride sheeting extruded by expanded tubing method.

The success of this low-cost production method depends to a major degree on NRM customers, prospects and their demands. It is up to the user of sheeting to work with NRM in running tests on his own type of compound. In many cases costs may be reduced still further and sheeting quality built only through close cooperation of the user with NRM.

NRM invites polyvinyl chloride sheeting users to contact material suppliers for details on polyvinyl chloride compounds suitable for extruding. Then come to NRM and we will work with you and demonstrate to you the quality of vinyl sheeting you can obtain by the expanded tubing process using standard NRM extruders and auxiliary equipment. Write NRM at Akron for complete details!



Standard NRM extruder shown is producing sheeting of Geon polyvinyl plastic by expanded tubing process. Sheeting is .015″ gauge. The "tube" has approximately a 12¾″ diameter for 40″ sheet width.

NATIONAL RUBBER MACHINERY CO. General Offices & Engineering Laboratories Akron 8, Ohio

PLANTS at Akron and Columbiana, Ohio and Clifton, N. J.
AGENTS East: National Rubber Machinery Co., Clifton, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Calif.
EXPORT Plastics Machinery: OMNI EXPORT CORPORATION
460 4th Ave., New York 16, N. Y.

Creative Engineering

COATED PRODUCTS COMMENTS

For better finishes in less time at lower cost

By standardizing on CARBORUNDUM's waterproof cloth belts, an increasing number of plastic molders are realizing more yield per belt of higher quality work at lower unit cost.

These time and money saving abrasive belts are designed and made specifically for the wet sanding of plastics. They retain their high initial cutting rate constantly throughout an extended service life. This water lubricated cutting action is fast, clean and cool. There is no frictional heat to burn or distort thermo plastic materials.

Formulated to retard "wet stretch," these belts save much down-time normally lost to belt tensioning. Because plastic dust is wet down, shop conditions are cleaner too.

In specifying CARBORUNDUM's waterproof belt cloth, you get the combined advantages of a hard, sharp silicon carbide abrasive, a resin bonding agent and a wear-resistant, pre-sized cloth backing. Order from your CARBORUNDUM representative and see for yourself the improved operating efficiency and economy these belts can provide. Coated Products Division, The Carborundum Company, Niagara Falls, New York.

COATED ABRASIVES BY

CARBORUNDUM

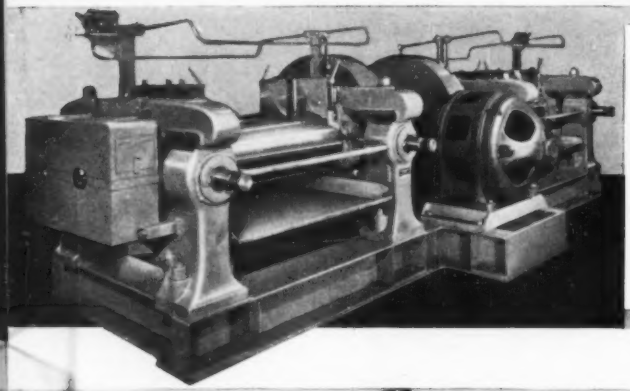
TRADE MARK

Making ALL abrasive products...
to give you the proper ONE

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company

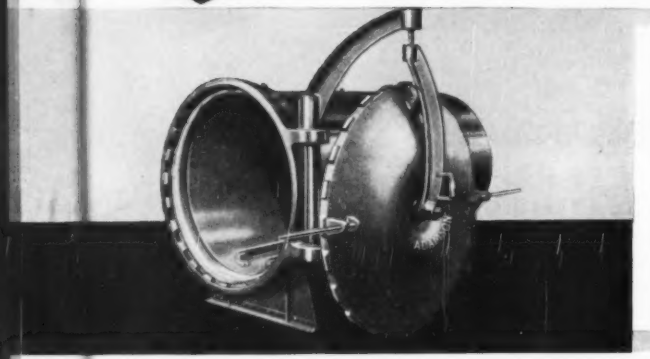
ADAMSON UNITED COMPANY
AKRON 4, OHIO

Plastics and



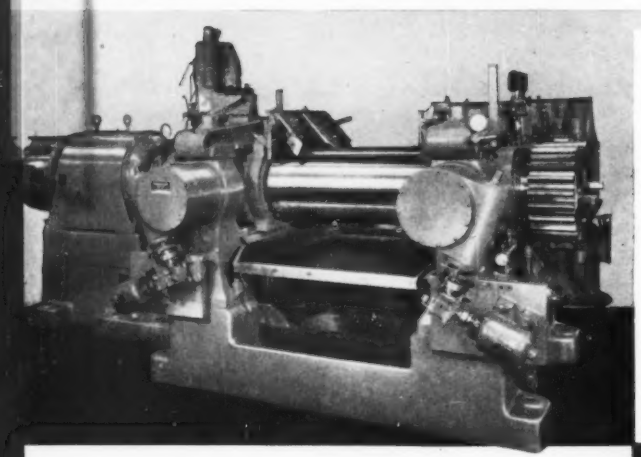
TWIN MILL UNIT

22" & 22" x 60" Mills designed and built for mixing and plasticizing an internationally known plastic material. The rolls operate in anti-friction bearings and the two Mills, together with right angle drive and motor, located between the units, are mounted on a continuous one-piece bedplate.



VULCANIZERS or AUTOCLAVES

Built in sizes ranging from 18 inches to 15 feet in diameter and any length, vertical or horizontal. Illustration shows a horizontal type with hinged, quick-opening door. Vulcanizers can be built to withstand internal pressures up to 1000 pounds per square inch. Write for our special bulletin .



MIXING MILLS

These are built in all sizes from 6" x 16" to 28" x 84". The one illustrated is a late model (shown without gear enclosure), designed for plastics. It has rolls 20" in diameter by 48" long on the working face; flood lubricated roll boxes; tilting stock guides; motor-operated adjusting screws; stainless steel stock pan; dial indicators for front roll position; two sets of connecting gears for operating rolls at two different friction ratios, and an individual motor drive, with geared head and flexible coupling direct-connected to rear roll.

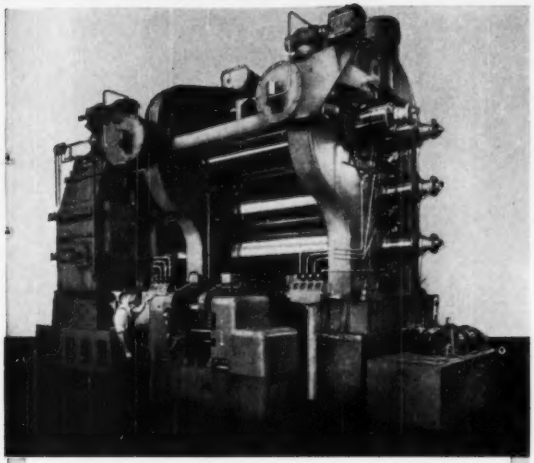
We can supply any size Mill driven individually; in pairs with right angle reducer between the units; or grouped on a line shaft with reducer at one end of the shaft.

Write for our new catalog covering Mills, Refiners, Crackers and Washers.

Designers and Builders of Basic Machinery for the Rubber, Plastics and Plywood Industries

Francis Shaw & Company
New York: 441 Lexington Avenue, New York City
Chicago: 140 S. Clark Street, Chicago, Illinois
Paris: 9 Avenue Percier, Paris, Seine, France
India: Ajanara, Post Anand, Bombay Province

Rubber Processing Machinery



CALENDERS

The large Calender has four rolls measuring 36" in diameter by 92" long on their working faces. They are mounted in anti-friction bearings which are preset for precision operation at high temperature. Each roll is individually-driven from a separate gear stand. All bearings are flood lubricated from a central supply. The off-set, top and bottom rolls have individual motorized adjustment through double Cone worm reducers.

The small Calender in the foreground has four rolls measuring 8" in diameter by 16" long on their working faces. These rolls also operate in selected anti-friction bearings which are flood lubricated.

Each Calender is provided with motor and electric controls installed on flush mounted panels.

In addition to designing and building Calenders, we can supply all the processing equipment necessary for a complete operation. This includes plastic sheeting and the coating of fabrics with plastic or rubber compounds.

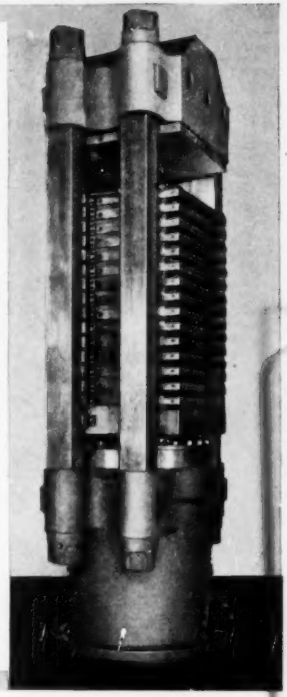
Write for our new calender catalog.

MULTIPLE DECK PRESSES

Multiple deck press with fifteen openings. This Press was constructed for extremely high pressures per square inch on the platens. We have standard designs for square platen presses in sizes varying from 12" x 12" to 60" x 60", and for Presses with oblong platens ranging from 12" x 14" to 70" x 84". Patterns and drawings are available for almost any size within the above two ranges but we are prepared to design and construct much larger ones.

These Presses can be built self-contained or for connection to existing hydraulic supply.

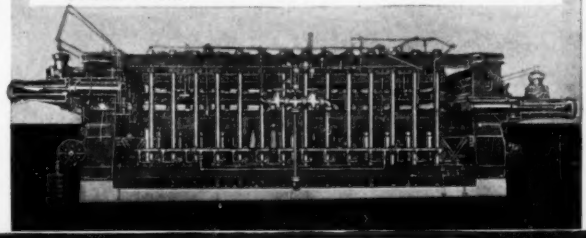
Write for our new catalog covering our full line of Hydraulic Presses.



BELT PRESSES

Belt Press with two openings. Platens are 63" wide by 31' long. This Press weighs over 300 tons and will deliver 250 lbs. per square inch on the platens. It comes complete with stretchers and clamps, the latter mechanically controlled directly from the movement of the platens. Standard designs for various sizes are available.

In addition to the above we also make a full line of open side Presses equipped with stretchers and clamps to cure endless V-belts.



ADAMSON UNITED PRODUCTS

- Mills
- Refiners
- Crackers
- Washers
- Rubber Sheeting & Coating Calenders
- Plastic Film Calenders
- Calender Wind-ups
- Calender Cooling Rolls
- Complete Calender Accessory Equipment
- Embossing Calenders
- Pot Heaters
- Vulcanizers
- Autoclaves
- Rotocure Machines
- Hydraulic Presses
- Multi-Platen Presses
- Automatic Curing Presses
- Belt Curing Presses
- Compression Molding Presses
- Plywood Presses
- Auxiliary Equipment

ADAMSON UNITED COMPANY

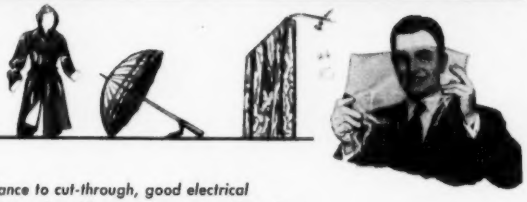
730 CARROLL STREET, AKRON 4, OHIO

Subsidiary of UNITED ENGINEERING AND FOUNDRY COMPANY. Plants at Pittsburgh, Vandergrift, New Castle, Youngstown, Canton

Marvinol® vinyl resins put more buy-appeal in these products

"Dry hand" and stitch-tear resistance makes Marvinol-based calendered sheets pleasant to touch, lasting, easy to work.

High physical properties and ease in processing, printing, embossing and heat-sealing are found in cast, calendered or extruded Marvinol-based films.



Resistance to cut-through, good electrical qualities and rapid extrusion rates are the extras Marvinol formulations offer extruders.

Sharply detailed Marvinol-based products are made by injection, low pressure, compression, slush and blow molding processes.

In new vinyl sponging operations, Marvinol formulations are being used for tough, lightweight cellular products.

Smart, colorful, long-wearing floor coverings are made from Marvinol-based formulations.

MARVINOL vinyl resins put buy-appeal in your products from the start. For superior physicals, Marvinol VR-10. For ease in processing, plus good physicals, Marvinol VR-20. Both resins offer you stability under heat, light and time; dimensional stability; low temperature flexibility; resistance to abrasion, wear, tear, oils and acids. Let us show you how to use Marvinol's timesaving features. All technical information developed in our modern laboratories is at your disposal, since it is through you that Marvinol reaches the consumer. Write today for the latest technical information. Dept. M-8, NAUGATUCK CHEMICAL, Naugatuck, Connecticut. *In Canada*, Naugatuck Chemical, Elmira, Ontario.

Other Products of Naugatuck Chemical:

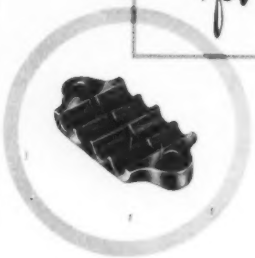
KRALAC molding powders • VIBRIN Polyester resins • PQL chemical and heat resistant baking enamel • SHRINKMASTER process for rendering woolens shrink-resistant and long-wearing • SPERGON fungicide for seed treating • TUFOR 2-4-D weed killers • PHYGON orchard and row crop spray fungicide • SURFA-SEALZ rubber compound for surfacing highways • LOTOL compound latices, natural and synthetic • DISPERSITE water dispersions of reclaimed rubber and resins • Reclaimed Rubber • Aromatics • Synthetic Rubber • Rubber Chemicals • Raw Latex • Plasticizers

Marvinol

NAUGATUCK CHEMICAL

DIVISION OF UNITED STATES RUBBER COMPANY

Automatic molding reduces cost for R-B-M



Plastics parts for an electrical assembly are produced by the R-B-M Division, Essex Wire Corporation, Logansport, Indiana, by automatic molding. These are the parts that started R-B-M on the molding of plastics.

R-B-M chose automatic molding because of its distinctive advantages . . . uniformity of parts . . . low mold cost . . . low labor cost . . . material savings . . . controlled inventory . . . minimum investment.

Stokes Model 741 fully automatic molding presses were selected for the job because of their reliable, foolproof and flexible operation . . . and the speed with which they can be set up for production. Stokes fully automatic molding presses greatly simplify molding practices . . . one man can tend a battery of presses.

If you want to learn if your parts can be produced more economically by automatic molding . . . send parts or blueprints for a full analysis. There is no obligation, of course.

STOKES MAKES Automatic and Semi-Automatic Molding Presses, Plunger Presses, Closure Presses, Preforming Presses, Industrial Tabletting and Powder Metal Presses, Vacuum and Special Processing Equipment, Water Stills and Special Machinery.

F. J. STOKES MACHINE COMPANY

5934 TABOR ROAD

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☐ *Send me complete literature on Stokes Automatic Molding Presses*

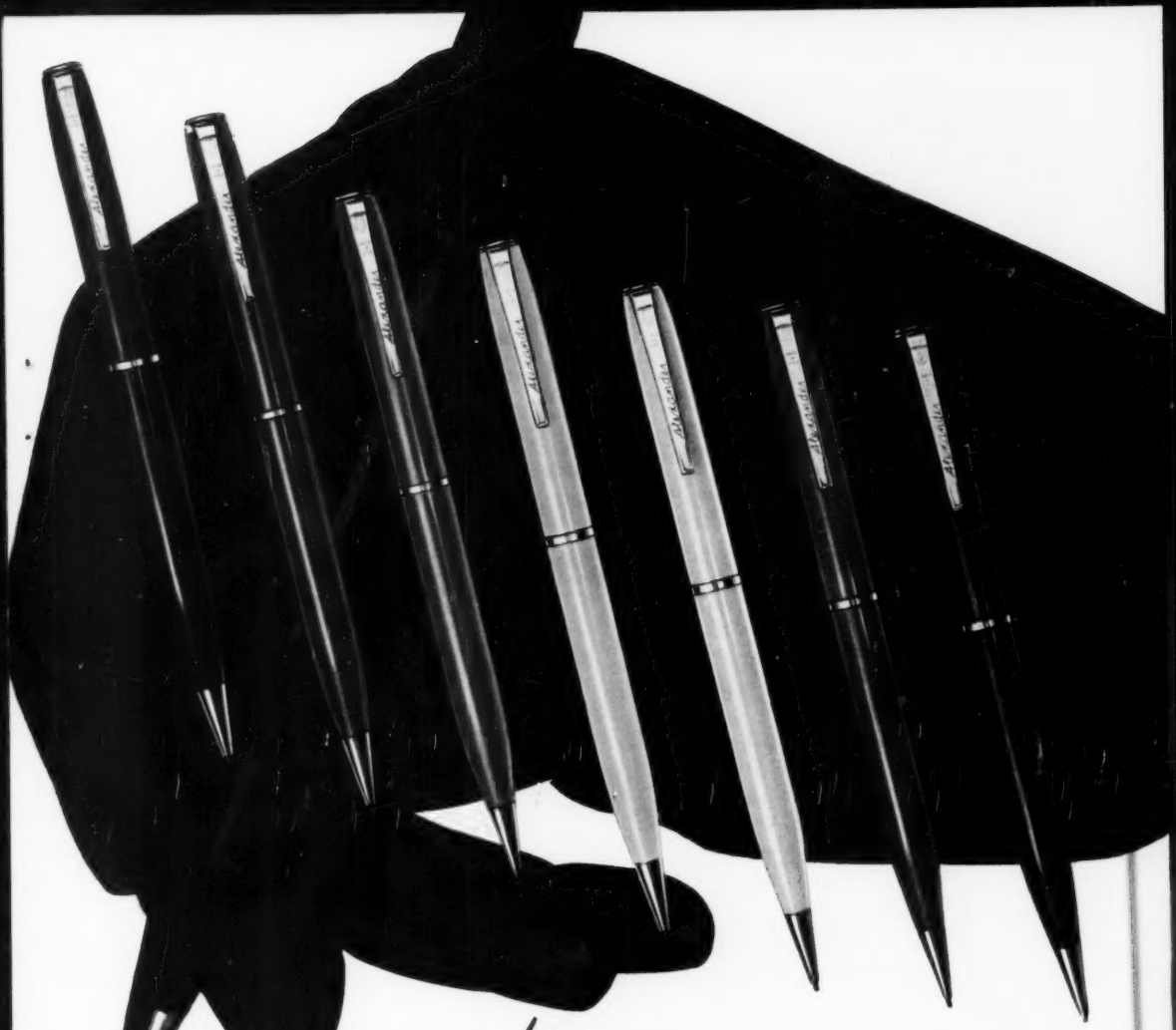
☐ *Part or blueprint is attached for your free analysis service*

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____ DV



Molded right for writing

Our molding assignment for these Alexander pencils was to produce writing instruments properly balanced—smooth of line. Color specifications were carefully met—functional needs of the product were painstakingly watched.

This careful consideration of functional needs characterizes our production activity. First we determine whether or not plastics can do the best job for you. Then we make sure *in advance*, that the plastic material used will be *right* for your product. Our engineers and molders now go to work and create a plastic product that is *right* every way you look at it. *Right* for appearance—*right* for stability—*right* for sales appeal.

We'd like to convince you in person that ours is the *right* molding service for you. Tell us about your plastic problems. You'll receive a speedy and, we believe, a helpful and profitable answer.

Write on your letterhead for the new injection Molded and Extruded Plastics catalogue. Or, for detailed information about Corlon plastic® pipe, tubing and fittings, write for circulars containing data and illustrations.

ELMER E. MILLS CORPORATION

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Plastacele, Fibestos, Lucite, Plexiglas, Nylon, Polystyrene, Styron, Loalin, Vinylite, Geon, Plexene, Polyethylene, Carex, Forticel, Corlon plastic®, Saran, and other Thermoplastic Materials

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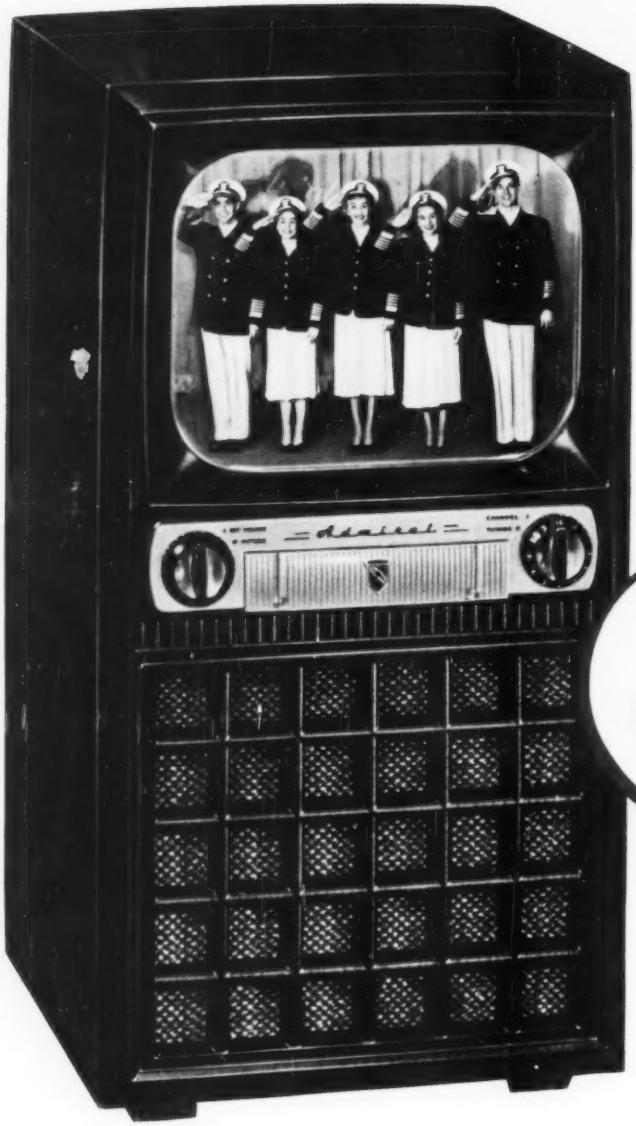

BIGGEST THING in Plastics Molded by MPc for *Admiral*

Cabinet for Admiral 16" Television Console	
Height:	34 in.
Width:	18 in.
Depth:	18¾ in.
Weight:	40 lbs.

Compression molded in one piece including center shelf to support television chassis. Power supply rests on bottom of cabinet. Speaker grille integrally molded. Cored-in openings for television window and control shafts. Internal ribbing adds strength and provides cored studs for mounting component parts. Automatically actuated side cores provide molded-in mounting holes in center shelf.

Consult with **MPc** engineers when planning large plastic parts. Address Molded Products Corporation, 4535 W. Harrison St., Chicago 24, Ill.

PLASTICS DIVISION
MOLDED MPc PRODUCTS
CORPORATION

"no more GAMBLING on tool steel selection"

[⅓ actual size; Selector is in 3 colors]

Since the first announcement, hundreds of tool steel users have received their CRUCIBLE TOOL STEEL SELECTORS. The comments received indicate that this handy method of *picking the right tool steel right from the start* is going over big.

"Handiest selector I've ever seen"

"No more gambling on tool steel selection"

"You're right, the application should dictate the choice of the tool steel" . . . and many, many more favorable comments.

You'll want your CRUCIBLE TOOL STEEL SELECTOR. It uses the only logical method of tool steel selection—begin with the application to pick the right steel! And the answer you get with one turn of the Selector dial will prove satisfactory in every case, for the CRUCIBLE TOOL STEEL SELECTOR covers 22 tool steels which fit 98% of all Tool Steel applications. ALL the tool steels on the Selector are in Warehouse Stock . . . that means when you get the answer, you can get the steel . . . fast!

Write for your Selector today! We want you to have it, because we know you've never seen anything that approaches your tool steel problems so simply and logically. Just fill out the coupon and mail. Act now! CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

Here's how it works:

To use the Selector, all you need know is the characteristics that come with the job: type and condition of material to be worked, the number of pieces to be produced, the method of working, and the condition of the equipment to be used.

FOUR STEPS—and you've got the right answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application—Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group — Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

One turn of the dial does it!

And you're sure you're right!!

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Dept. MO, Chrysler Building
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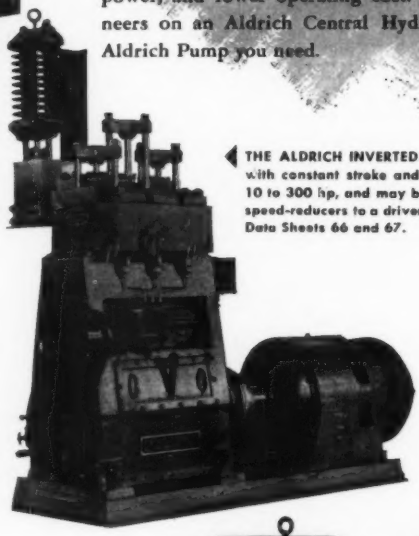
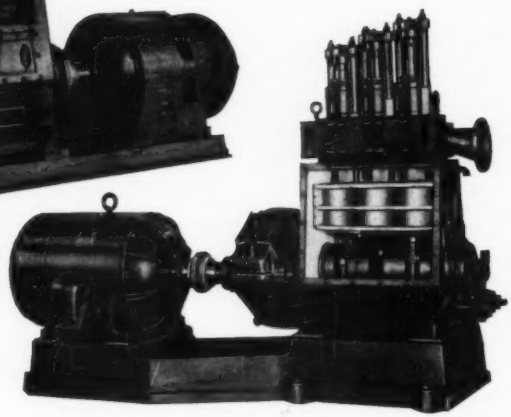
One Aldrich Pump can serve all your presses and reduce costs through: minimum investment for equipment, less maintenance and repair, more efficient production of power, and lower operating cost. Check with our engineers on an Aldrich Central Hydraulic System and the Aldrich Pump you need.

THE ALDRICH-GROFF "POWR-SAVR" CONTROLLABLE CAPACITY PUMP . . . supplies only that hydraulic power actually needed. Delivery is almost directly proportional to demand. An automatic stroke regulating mechanism compensates for variation in power needed and eliminates start-stop operation. A relatively small accumulator is required. Request Data Sheet 65.



THE ALDRICH INVERTED VERTICAL TRIPLEX PUMP . . . with constant stroke and constant speed, ranges from 10 to 300 hp, and may be coupled directly or through speed-reducers to a driver located on the floor. Request Data Sheets 66 and 67.

THE ALDRICH-LYTLE AIR POWERED PUMP . . . operates on available plant air pressure (not over 100 lbs.) and delivers up to 20,000 lbs. pressure.



THE 5" STROKE DIRECT FLOW PUMP . . . new to the Aldrich line, this unit has a through-flow, close clearance design and a sectionalized construction which features extreme simplicity and maintenance economies. Drive can be by electric motor, turbine, steam or internal combustion engine. Request Data Sheet 64.

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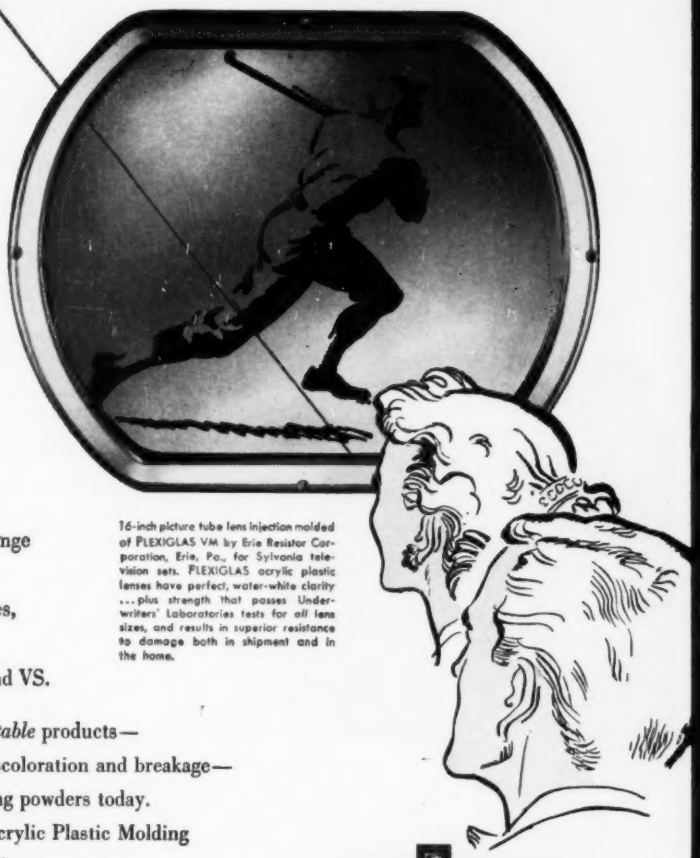
The excellent flow characteristics of PLEXIGLAS powders permit satisfactory molding over a wide range of temperatures and pressures. We offer 3 different injection grades, each developed to meet specific requirements—PLEXIGLAS V, VM and VS.



16-inch picture tube lens injection molded of PLEXIGLAS VM by Erie Resistor Corporation, Erie, Pa., for Sylvania television sets. PLEXIGLAS acrylic plastic lenses have perfect, water-white clarity ... plus strength that passes Underwriters' Laboratories tests for all lens sizes, and results in superior resistance to damage both in shipment and in the home.

For injection molding of *durable, stable* products—resistant to high heat, weather, discoloration and breakage—get full details of PLEXIGLAS molding powders today. Our newest booklet, "PLEXIGLAS Acrylic Plastic Molding Powders", gives complete information.

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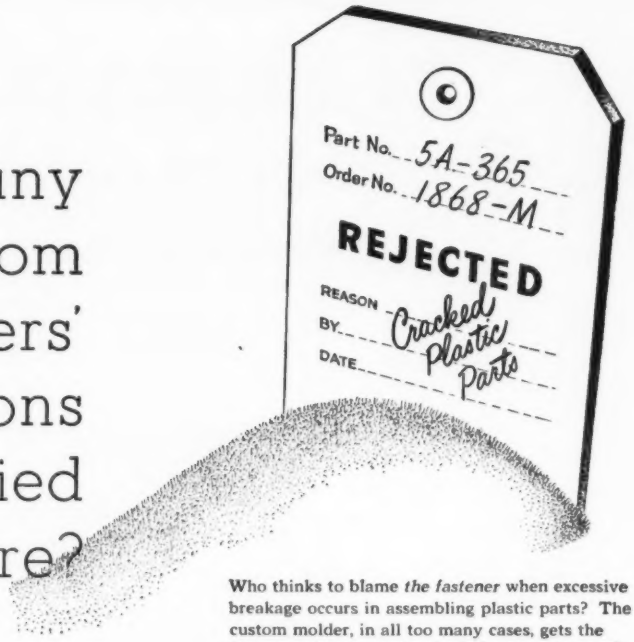
How many custom molders' reputations lie buried here?



Who thinks to blame *the fastener* when excessive breakage occurs in assembling plastic parts? The custom molder, in all too many cases, gets the blame . . . his reputation buried under a heap of unfair criticism.

Yet a *wrong type* fastener too often is the cause. Through parts spoilage, it can send production costs soaring and whittle profits down. This — in addition to putting the custom molder on the spot!

No wonder so many molders today — and manufacturers, too—insist on fastening recommendations from Parker-Kalon before getting assembly lines into motion.

For many reasons P-K recommendations are worth getting. Parker-Kalon will fit the fastener to your special need — not your needs to the fastener. Parker-Kalon can do this because P-K alone makes a *complete* line of Self-tapping Screws. First to introduce Self-tapping Screws; first to learn how to maintain proper balance between toughness and hardness; first to perfect controls that assure uniform quality — you can count on Parker-Kalon today as always, for Self-tapping Screws that keep assembly lines fast moving and trouble free.

GET THE ADVICE OF A P-K* ASSEMBLY ENGINEER

— preferably at the design stage of your product. There is no obligation; you may find yourself dollars ahead. Write Parker-Kalon Corporation, 200 Varick Street, New York 14, N. Y. P-K Self-tapping Screws are sold by accredited Distributors everywhere.

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3 to 20 ounce capacities

IT COMPOUNDS
IT EXTRUDES
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New TWIN SCREW RC-65 EXTRUDER
(3.5" worms)
Capacity: 65 pounds per hour

Perfect mixing, plasticizing, compounding, colouring and pelletizing. Low operating and power costs. From .010" monofilaments to 10" tubes, strips and special sections. Built to American Standards of Performance.

Also

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(4.3" worms)
Capacity: 100 pounds per hour

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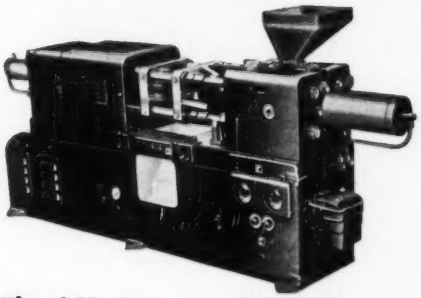
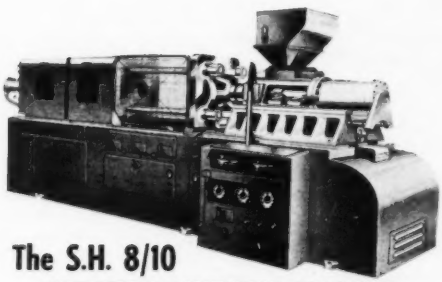
(4.7" worms)
Capacity: 200 pounds per hour



The S.H. 4 **INJECTION MOULDING MACHINE**

Hydraulically operated moulding press of 4 oz. capacity. Automatic cycle control. Simple and economical to operate. Low initial cost.



The S.H. 8/10
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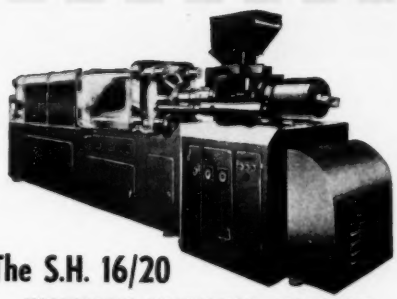
Automatic Controlled Cycle or Hand Operated

Fast cycling machine for moulding a wide range of plastic materials. Other size models H.E.9, H.E.7, E.4, S.H.3, S.H.6/8



The S.H. 16/20
INJECTION MOULDING MACHINE
With Automatic Time Cycle Control

This heavy duty machine is capable of producing articles up to 20 oz. in weight, in a variety of materials. It incorporates several new cost reducing features.

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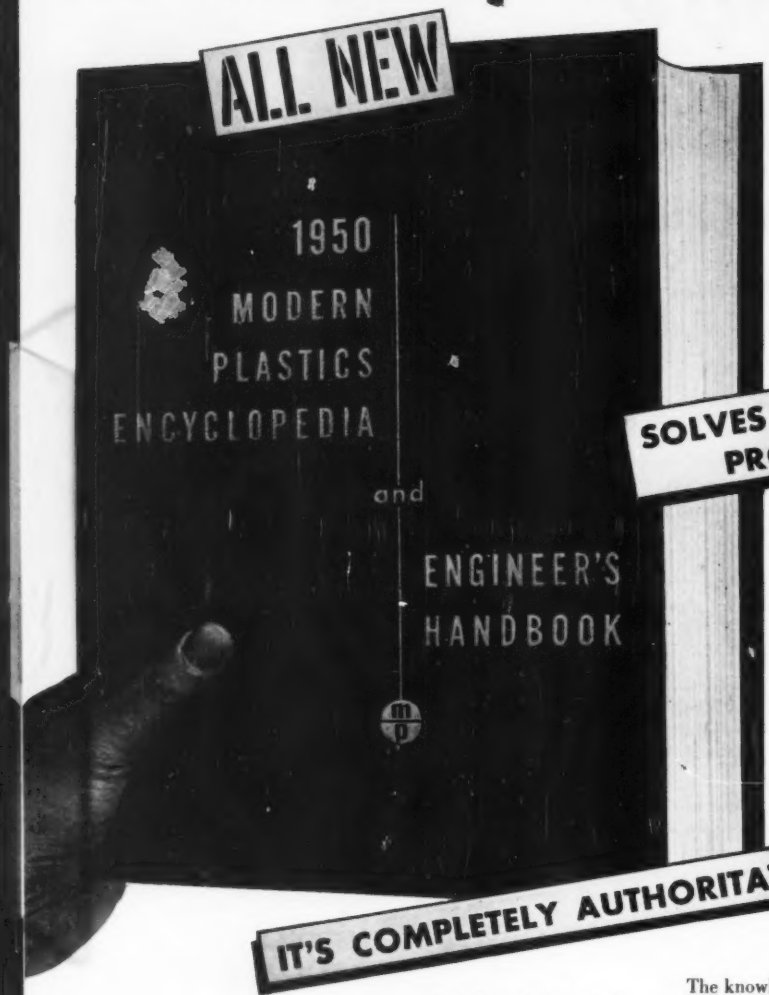

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which plastic to use
how to design for plastics
what production method
how to mold, fabricate
how to finish and assemble
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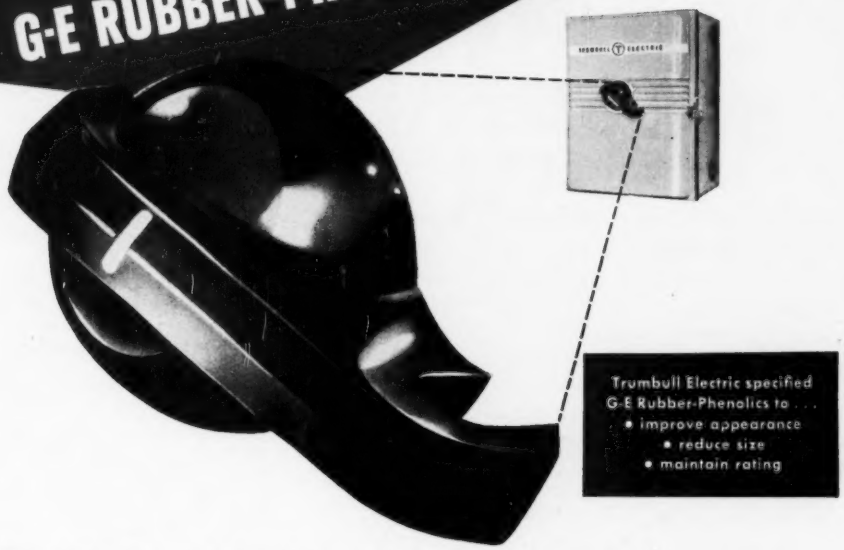
FOR Plastics Parts WITH AMAZING SHOCK RESISTANCE SPECIFY G-E RUBBER-PHENOLICS



Here's how General Electric's new shock-resistant rubber-phenolic compounds helped Trumbull Electric Mfg. Co. to reduce the size of a safety switch one-third, and also improve its operating characteristics. To get this great reduction in size, Trumbull had to move the handle from the side to the front of the box. The material for the handle had to have good appearance plus unusual shock resistance to withstand severe service conditions. A wood flour-filled G-E rubber-phenolic was picked because of its excellent flow in the mold, great shock resistance, and good appearance when molded.

The molder—Kuhn & Jacob—has an economical operation and high production because the shock-resistant G-E rubber-phenolic compound can be preformed and molded like general-purpose phenolics. Expensive hand cleaning is unnecessary because of the easy flash removal of this new material.

There's a whole family of G-E rubber-phenolics to choose from. Each has the characteristics of its filler plus shock resistance more than 5 times greater than ordinary phenolic compounds.

Find out how this remarkable family of compounds can help you make new, different, *tougher* plastics products by writing us today for experimental samples and detailed data sheets. Address Section D2, Chemical Department, General Electric Company, Pittsfield, Massachusetts.

You can put your confidence in

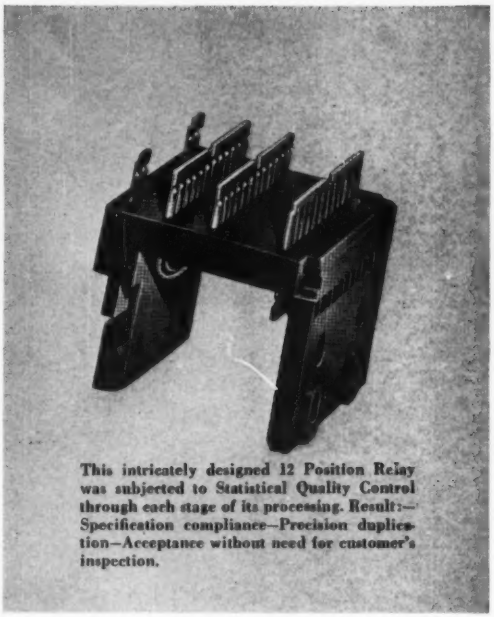
GENERAL ELECTRIC

*One of a Series of Messages to the Buyer of Custom Molded Plastics

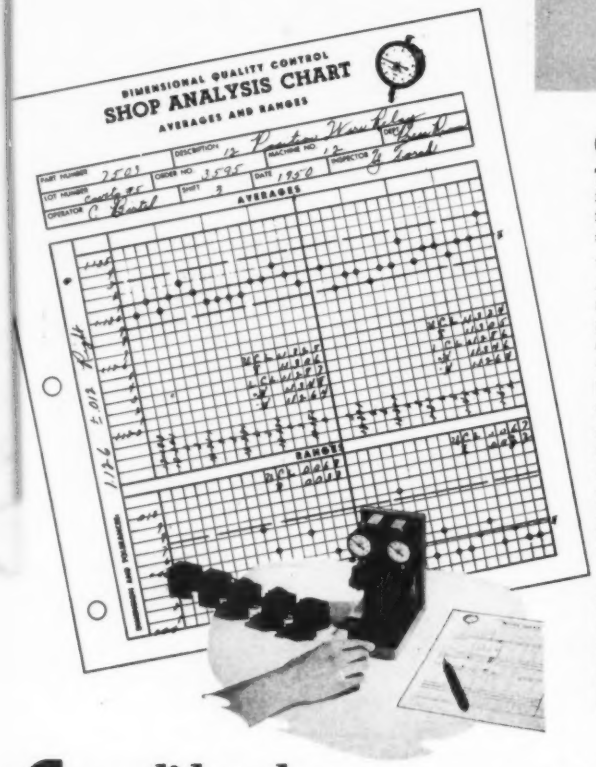
...when plastics parts are molded to the teachings of

Statistical Quality Control

—*they bring home Good Report Cards!*



This intricately designed 12 Position Relay was subjected to Statistical Quality Control through each stage of its processing. Result:—Specification compliance—Precision duplication—Acceptance without need for customer's inspection.



OF Consolidated, it must never be said, that —"For the want of a rule, a part was lost"! Today, much of the custom molder's business is precision work. His place in industry's confidence is determined by experience, progressiveness, price dependability—and by *quality* ... in the fullest meaning of the word!

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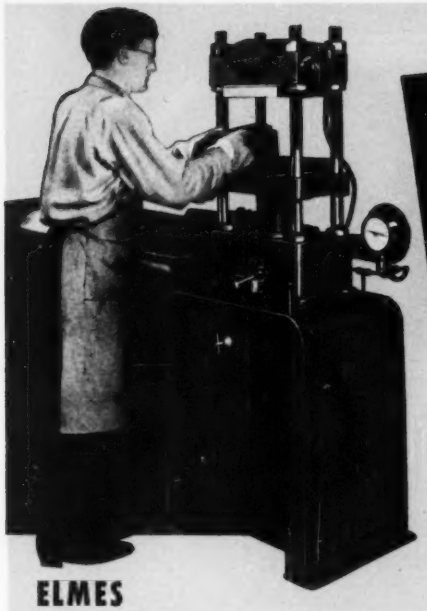

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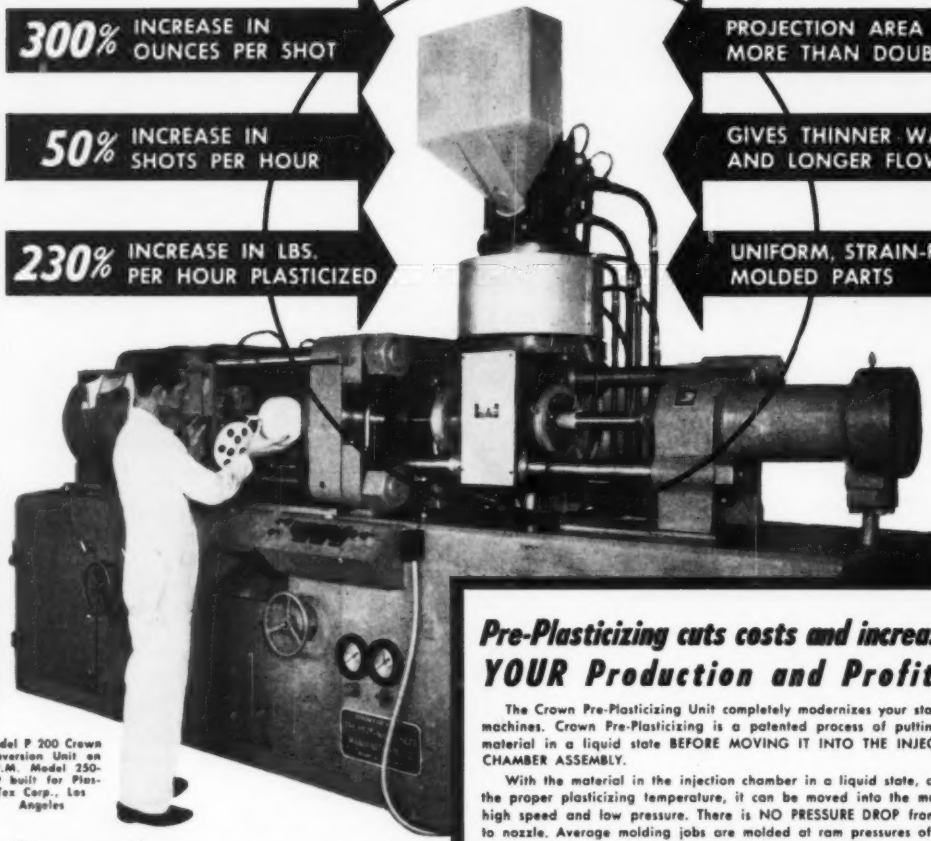

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CP50-6

Mr. Businessman!

WHAT WILL THE 1950 CENSUS DO FOR YOUR BUSINESS?

CONSUMER MARKET INFORMATION

The 1950 Census will provide a huge amount of information about the characteristics of the consumer market. It will tell you what kind of income groups live where . . . what they have and what they need in the way of commodities from automobiles to television sets down to plumbing fixtures. The Census is an accurate survey of economic conditions in your market area. It will not only tell you *where* your customers are, but *what they need that you have to sell them!*

It will show where improved transportation and shipping facilities are needed . . . better harbors and waterways . . . stepped-up Public Service.

That is why the 1950 United States Census is vital to your business!

COOPERATION

You know that the Census-Taker is not just "counting heads." He's actually making a survey of existing conditions in industry, business, employment, housing, education. *You* know census information is as confidential as the vote you cast! Because you know all these things *you'll* cooperate with the Census-Taker in every way when he calls on you.

WHAT ABOUT THE OTHER FELLOW?

But! What about the people who work for you? The man in the shop . . . your own secretary . . . the fellows in the shipping room. Do they know all this about the Census? Chances are some of them do, so the idea is to get the right information across to those who don't!

WHAT'S THE BEST WAY?

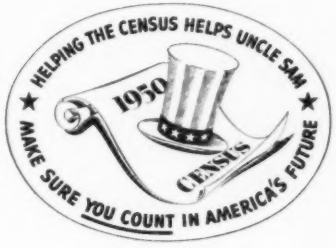
If it's possible, call everyone together and talk about it . . . ask questions . . . exchange ideas. If your outfit is too big for that, direct a Census information memorandum to all your employees. Post information on the bulletin boards. Run a Census story in the company house organ. Talk about it. *Every way you can . . . get the people who work for you to cooperate with the Census.*

WHAT DOES THE 1950 CENSUS MEAN TO YOUR EMPLOYEES?

Better schools . . . school buses . . . school lunches. It means finer roads, bridges and highways . . . increased transportation facilities . . . improved safety regulations. It creates more efficient Public Service and furthers adequate distribution of utility services such as telephones, gas, water and electric power. It will help your community plan better parks, playgrounds, recreation areas and housing. It will mean higher living standards and accurate congressional representation. The Census is *everybody's voice in America's future!*

YOU OWE IT TO YOURSELF...

Mister Businessman . . . to your business and your community! Put your efforts behind the 1950 United States Census for an even better country to live in . . . the *best* country to do business in!



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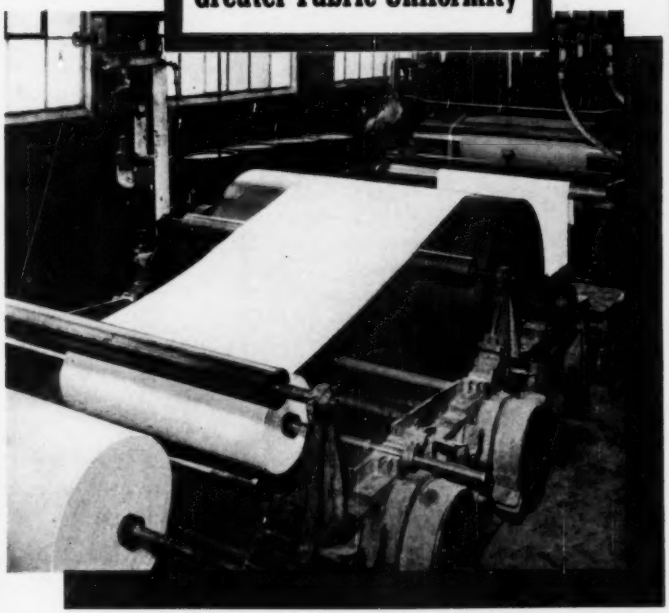

The rigid laboratory checks which control the production of Mt. Vernon Extra fabrics assure the high degree of uniformity you need for dependable lamination.

AT YOUR SERVICE

Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

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LOW VISCOSITY... HIGH STABILITY...

Plastisols, Organosols!

with Oxidation Resistant* THFO, Plastolein 9250

UNLIKE ordinary THFO, Plastolein 9250 Tetrahydrofurfuryl Oleate is formulated to provide maximum resistance to oxidation and rancidity. Amazingly low in cost yet very effective as a viscosity depressant for Plastisols and Organosols, 9250 also shortens grinding time and produces dispersions with exceptionally fine flow characteristics.

Plastolein 9250 THFO also has wide application as a highly efficient secondary plasticizer for unsupported films, coated fabrics, extrusion compounds and other vinyl applications, because of . . .

- Low Cost
- Oxidation Stability
- Low Temperature Flexibility
- No Odor
- Heat and Light Stability
- Low Modulus
- Excellent Drape
- Internal Lubrication

Emery also manufactures a group of Plastolein Plasticizers with low volatility, high water and oil resistance. They are designed to provide low-temperature flexibility and yield films that are clear, free from haze, and have excellent tear strength.

For better products, products that stay better longer . . . buy Emery Plastolein Plasticizers!

OXIDATION TIME TEST

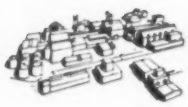
*Plastolein 9250

330

Regular THFO

48

A measure of oxidation resistance is the time required for the absorption of a standard quantity of oxygen. Naturally, a longer time indicates higher stability. Note that Plastolein 9250 is 7 times more stable than ordinary tetrahydrofurfuryl oleates.



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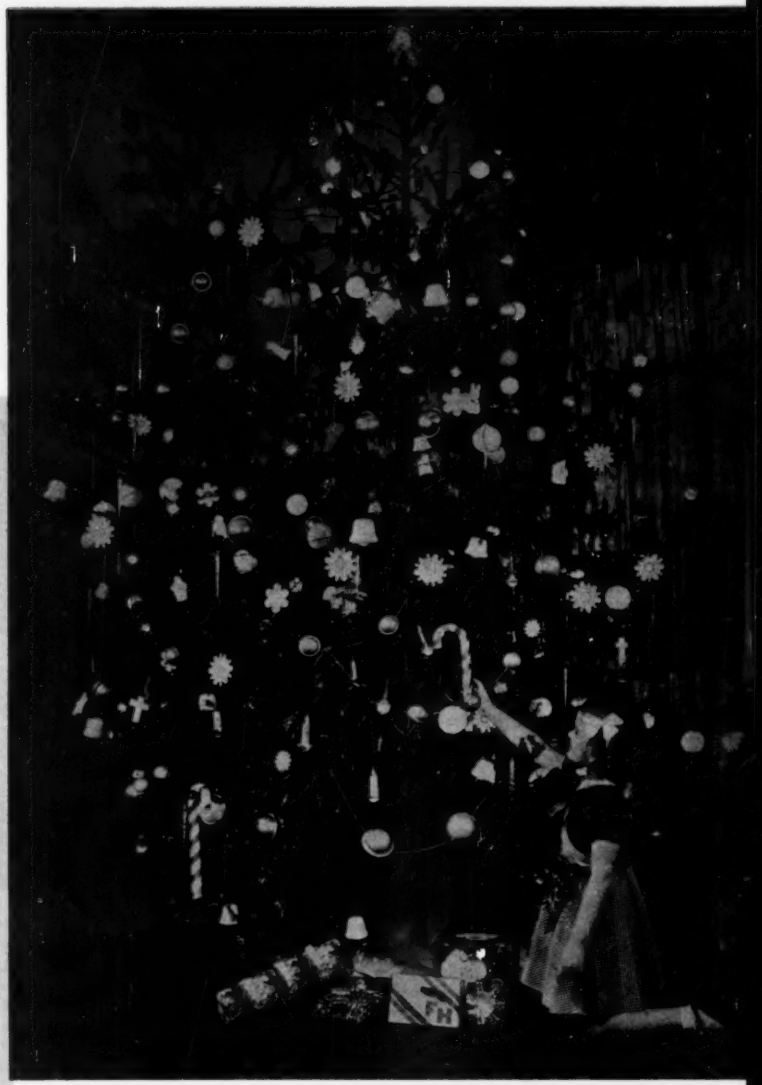
MODERN mp PLASTICS

VOLUME 27 AUGUST 1950 NUMBER 12

Why Santa Uses More Plastics

FEW fields of application have given more incentive to the production of improved materials, especially thermoplastics, than has the vast field of Christmas decorations and ornaments. High heat resistance, high impact strength, and flame resistance are now standard properties of most of the materials used in these products today. Ingenuity in design of parts and molds has likewise been encouraged in this field where color, motion, and light combine through plastics to provide beauty of decoration with maximum



PLASTICS ON THE TREE

***Tree top Angel Light*—All parts injection molded of flame-resistant acetate. Sockets compression molded of phenolic. Wire is insulated with vinyl. *Tree lights*—Fancy Figures, Bubble Lites, Snow Flake Gems, and Candle Lights, all flame-resistant acetate. (An illuminated decoration by Noma Electric Corp.)**

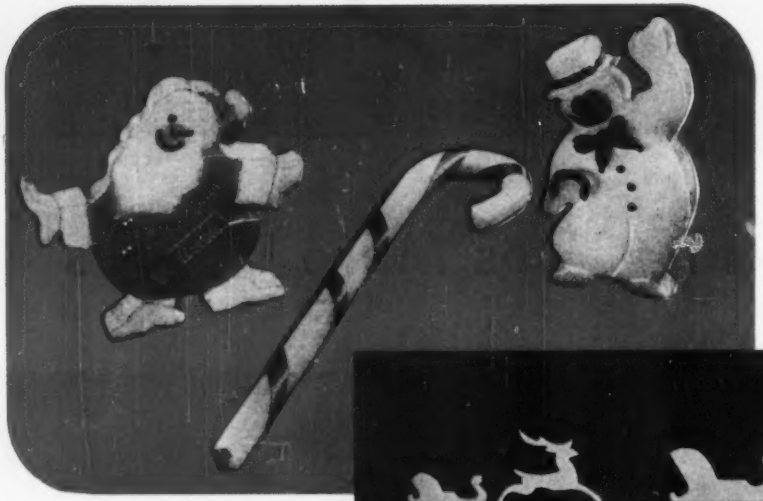
***Foamed styrene decorations*—bells, balls, canes, crosses, and snowmen. (From Frank Paper Products Corp. and Nesbit Industries, Inc.)**

***Cellulose acetate balls on strings*—Formed from sheet stock in 2- and 3-in. diameters. (By Plaxall, Inc.)**

***Styrene snow flakes*—Injection molded. (By Plaxall, Inc.)**

***Icicles*—Injection molded styrene. (By Rubar Plastics, Inc.)**

***Feather Festoons*—Metal-plated cellulose acetate, 0.0075 in. thick. The material is plated with silver by vacuum deposition and then coated with a special safety-type lacquer which does not increase the flamability. Plating is done by Coating Products; the Festoons are produced by Modern Miltex Corp., using combined die-cutting and other operations.**



Three Christmas items fabricated from foamed styrene. Cane is produced by hot-wire extrusion, while snow man and comic Santa Claus are made by combination of extruding and band sawing. Decoration on Santa is sprayed enamel. Items made by Nesbit Industries, Inc.

Outline of foamed styrene ornament is produced by extruding through special hot dies. Parts are band-sawed to required thickness. Frank Paper Products Corp.

safety and the utmost durability.

The over-all picture of Yuletide decoration is one of big business. Some estimates place the retail dollar value as high as a total of $100 million; others, more conservative, vary from 60 to 70 million. Plastics cannot capture this entire market, but the industry's present share is at least $40 to $45 million dollars, with perhaps 30 million accounting for electrically illuminated decorations.

A sizable percentage of the illuminated decorations is made up of novelty lights. In practically every case these incorporate molded plastic figures or other plastic components, such as the base of the now familiar Bubble-Lite. This light, developed in 1941 and first commercially produced in 1945, has since been made and marketed to the tune of better than 100 million lights; the banner year was 1948 when an estimated 40 million lights were sold, according to S. L. Marshall, assistant to the executive vice president, Noma Electric Corp., New York, N. Y. Practically all the wire used in Christmas lighting sets makes use of vinyl insulation; the sockets generally are molded phenolic or urea.

Large Santa Claus is made of foamed styrene by Frank Paper Products Corp. Decoration is produced by spray painting with masks as well as hand painting the features. Belt is extruded vinyl

While the familiar glass ball Christmas tree ornament still holds the lead in volume of sales in its class, its great fragility has opened the way for heavy sales of ornaments made of pure-white foamed styrene, metal-plated cellulose acetate sheet cut and formed on ingenious machines in all kinds of shapes, short lengths of extruded tubing bonded together in various attractive designs, and molded styrene balls, icicles, and other pieces.

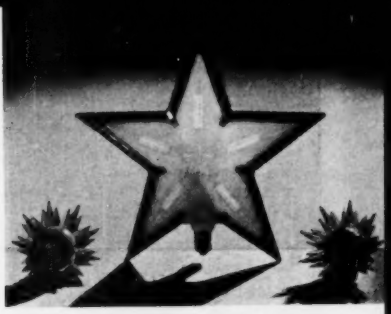
When this wide variety of plastics ornamentation is used, the classic Christmas Eve accident of knocking over a fully decorated tree is no longer tragic; the plastic decorations stand up under all but the most severe abuse.

No longer are outdoor and indoor Christmas trees illuminated only by plain lights. Rather, many of the light bulbs are enclosed in translucent plastic molded into the shape of candles, stars, balls, figures, and a variety of other designs. Over the past 12 years, hundreds of millions of these illuminated plastic ornaments have been sold.

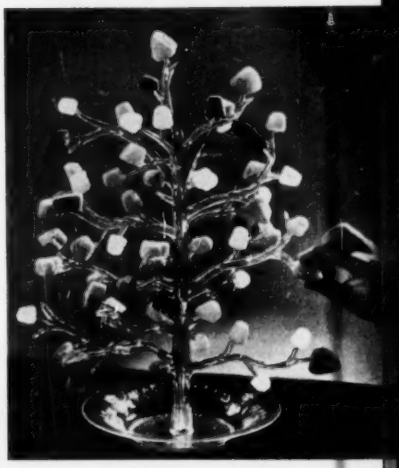
COURTESY HERCULES POWDER CO.

Nine illuminated ornaments make use of flame-resistant cellulose acetate in one or more of their components. These items are made by Noma Electric Corp.

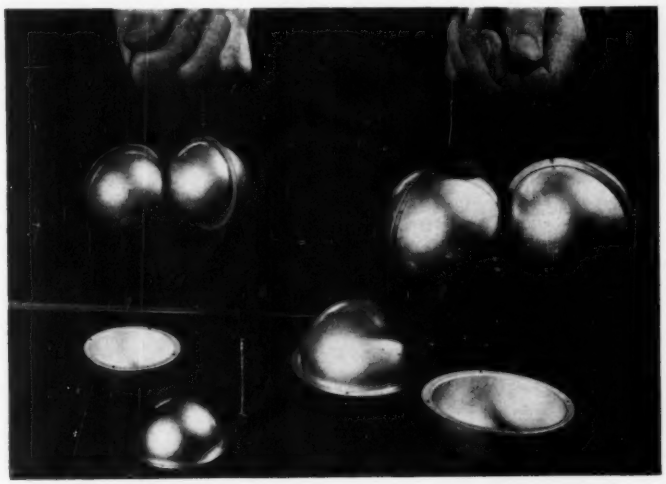
During all these years, the illuminated ornaments were used throughout the country, with great satisfaction to the users. However, during the Christmas season of 1948 some question was raised about their safety. A number of complaints were received by fire officials to the effect that the ornaments smoked and melted. The plastic material generally used in illuminated ornaments at that time was either sty-



Illuminated star and rosettes are made with flame-resistant cellulose acetate rims and either melamine or urea centers. Once assembled, rosettes are held by center parts. Developed by Raylite Electric Corp.

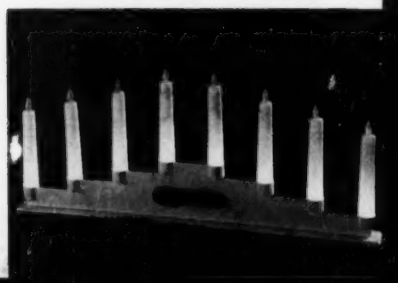


Styrene sugar-plum tree is molded in two halves in two-cavity mold. Assembly is accomplished by sliding slot of one trunk piece into grooved mating section. Base of tree fits into styrene base molded in four-cavity mold. Tree produced by Banner Plastics Corp.

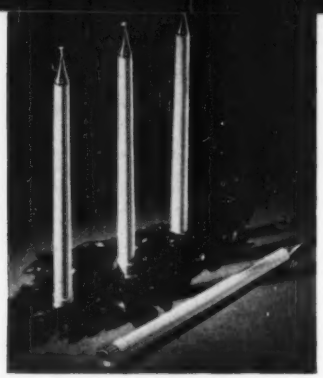


Two-piece cellulose acetate decorative balls are produced by Plaxall, Inc., in clear and opaque colors, as well as in various metallic and fluorescent shades. Available sizes range from 2 to 8½ in. in diameter. The balls are formed from sheet stock in automatic presses in a continuous process. Each wall section is pierced with small holes around perimeter. Bead chain and special hook devices pass through holes not only assembling balls but permitting them to be strung in continuous chains. Acetate sheet is furnished by Eastman Kodak Co., Celanese Corp. of America, and Monsanto Chemical Co.

Illuminated translucent Candolier is designed by Noma Electric Corp. Candles are compression molded of urea; simulated flame is injection molded of flame-resistant cellulose acetate. Bulbs are mounted in base.



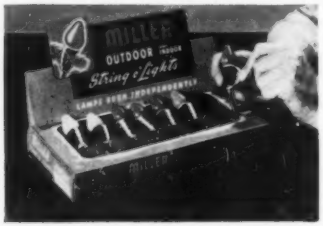
Decorative Christmas trees made by Plastic Art Toy Corp. of America have all parts injection molded of styrene. Tree is assembled by inserting trunk in base and slipping branches over staff. Molded-in spacers separate branches



COURTESY TENNESSEE EASTMAN CORP.

Candles that burn without dripping wax are molded in various colors of Tenite I cellulose acetate by Mitchell Parker Mfg. Co. Lighter fluid, poured into well covered by cap at top feeds wick which burns for 2 to 3 hours

Glowing snowman (left) skier (right) and illuminated musical Santa Claus in center are all injection molded of styrene. Santa Claus figure rotates, while a Swiss music-box plays Christmas tunes. Made by Miller Electric Co.



String of tree lights, made by Miller Electric Co., has vinyl-insulated wire, molded phenolic sockets, and a flexible clip of injection-molded elastomeric vinyl for holding bulbs on tree. Set won a home safety award in 1949

rene or a standard formulation of cellulose acetate.

Noma, major producer of Christmas lighting decorations, became very much concerned over these complaints, however unfounded. Even though it was definitely proved that no fire hazard was involved, steps were taken to remove the slightest possibility of future trouble. The information which Noma collected was disseminated to all the other ornament manufacturers in order to raise the standard of quality of the products of the industry as a whole.[1]

In the early part of 1949 a committee was formed under the auspices of S.P.I. to make further study of the entire illuminated ornament situation. As a result of this work, a number of recommendations were made. These had to do with such factors as close production control of the small 15-volt lamps used for the illumination (to prevent overheating); modification of the shape and contour of ornaments; adding vent holes and slots in order to increase ventilation; using adhesives or cements compounded of more fire-resistant materials; making use of a special formulation of self-extinguishing cellulose acetate developed and produced by Hercules Powder Co., Wilmington, Del.; and using thermosetting materials such as urea and melamine wherever possible.

[1] Details on this work were supplied by Stanley Bindman, formerly with Noma Electric Corp., and now president of Gemloid Corp., Elmhurst, N. Y.

Electrical test rack in laboratory of Noma Electric Corp. on which all plastic illuminated Christmas tree ornaments are tested to destruction. Safety checks are also made on production ornaments for maintenance of quality standards

Laboratory of Noma Electric Corp. is equipped with special thermostatically controlled oven. Heat resistance of production ornaments is continuously checked to assure that material's temperature resistance remains at correct level

PHOTOS COURTESY HERCULES POWDER CO.

The self-extinguishing cellulose acetate mentioned is so named because it will not support combustion. That is, the plastic will burn as long as a flame is applied to it, but will stop burning when the flame is removed. Hercules worked very closely with Noma in the development of this new acetate formulation. The material did not originally mold as easily as other thermoplastics and because of certain components of the material, it was thought that dangerous fumes might be given off during the molding operation. A careful check in the Noma plant, however, failed to show the presence of toxic gases. Also, advanced molding techniques have made it possible to handle this new material as fast and with just as small a percentage of rejects as other thermoplastics. Flame-resistant cellulose acetate formulations are also produced by Celanese Corp. of America.

Quality Control

Although the use of new materials and better product design has eliminated practically all consumer problems in connection with illuminated plastic Christmas ornaments, Noma maintains a sizable laboratory in which all new products are tested to destruction before being put into production; later, laboratory spot checks are made for purposes of quality control. Such precautions assure that the products will give safe and satisfactory service in the hands of the consumer.

The lengths to which the industry will go in order to remove even the remote possibility of danger from illuminated Yuletide decorations is further emphasized by the work of Raylite Electric Corp., Bronx, N. Y. In 1946, this company marketed an illuminated two-color star with a white body compression molded of urea and a red rim injection molded of styrene. The company states: "Although we never had any trouble with the styrene rims, we changed over to flame-resistant acetate to be on the safe side."

This company also produces a small illuminated rosette, the two-piece body being urea and the star-like rim being molded of flame-resistant acetate. The three parts are locked in place around the bulb by an ingenious snap-fit assembly. Thus there is no need for the use of cement which might smoke when exposed to the heat of the bulb.

Double-faced outdoor piece produced by General Plastics Corp. is formed from sheet stock of cellulose acetate butyrate, and equipped with eight 8-in. illuminated stars. Each star is decorated with evergreen roping. Large star is spring mounted in center

Illuminated wreath consists of two white translucent rigid halves of vinyl formed in three-dimensional relief and bolted together. Unit, made by General Plastics Corp., is double faced and 20 in. in diameter. Coloring is two-tone green with red cherries and bells

Illuminated Santa, 5 ft. high, made of formed vinyl sheet by General Plastics Corp. Decoration is printed on sheet before forming

COURTESY HERCULES POWDER CO.

Body of Santa wreath is molded of flame-resistant cellulose acetate, by Noma Electric Corp., and is sprayed with colored flock

Altar body is injection molded of acetate. Cross and 8 candles of translucent acetate glow from interior light. Photo of last Supper is glued on. Noma Electric Corp.

COURTESY HERCULES POWDER CO.

Plastics Outdoors

While Christmas decorations for home use constitute by far the largest segment of the Yuletide plastics market, outdoor civic and commercial Christmas displays provide very good business for companies specializing in this type of work. The word "specializing" is used advisedly because the materials, production methods, and merchandising approach are entirely different for

these larger units. The products, because of outdoor exposure and large size, are not subject to the high heat problems of the indoor decorations. On the other hand, the materials used for such parts must withstand the ravages of wind, snow, sleet, and sunlight. For the former reason, flame-resistant materials are not required; for the latter reason, weather-resistant materials are required. Happily, several thermoplastics fill the bill. Two of them—cellulose acetate butyrate and vinyl—are excellent from the production standpoint of heat-forming. They also can be effectively decorated by silk screening or other painting methods.

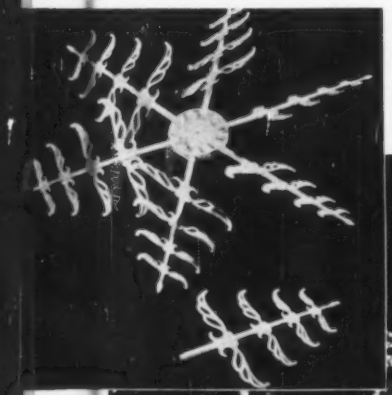
Five-Foot Santa

General Plastics Corp., Marion, Ind., uses these two materials to produce a complete line of illuminated plastic Christmas lighting units as well as decorative plastic plaques. These parts range from 8-in. diameter bells and balls through 13- and 22-in. five-pointed double-face stars; wreaths with candles, Santas, deer, and Merry Xmas lettering, measuring from 22 to 39 in. in diameter; and double-face, single or triple bells measuring 24 and 39 in. in diameter, respectively. The company's latest item for the 1950 season is a 5-ft. high illuminated Santa sign. Richard H. Erlewine, vice president, states that General Plastics sold complete Christmas outdoor decorative installations to 500 cities in 47 states for the 1949 season. A letter from the Chamber of Commerce of Maryville, Mo., to General Plastics points up the merchandising and promotion advantages of civic holiday decorations. The letter states: "We are sure the seven hundred dollars that we spent with your company brought at least 20% extra sales to Maryville."

Since 1940, Rockefeller Center, New York, has made increasing use of plastics for Christmas-time decorative schemes. Each year Robert Carson, architect and designer for Rockefeller Center, has used large plastic globes for decorating the immense tree which stands just west of the sunken skating rink and faces the Promenade. These globes are injection molded of styrene and are spray painted in several colors.

Whirling Snow Flakes

In 1949, plastics were used in the decorative scheme for the Rockefeller Center Promenade as well. Dozens of what appeared to be huge whirling snow flakes mounted on curved aluminum rods decorated the sides of the planted area of the Promenade. Ten of these "snow flakes" were mounted on each aluminum rod. Each "snow flake" had an injection-molded styrene hub in which an oil-less bearing insert is molded in. Around the periphery of the hub were inserted six decorative arms designed and assembled in such a way that they caused the unit to rotate about the central axis in even a slight breeze. These "snow flakes" as well as the large styrene balls used on the Rockefeller Center tree were produced by Plaxall, Inc., Long Island City, New York.

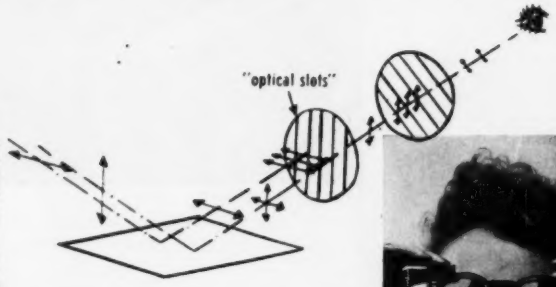


Left: Pin wheel, injection molded in clear or white styrene by Plaxall, Inc., has six branches assembled in hub and tilted slightly. When hub is mounted, light breeze will revolve unit. Below: Display of pin wheels on Rockefeller Center Promenade

Pictures Tell the Story

The scope of plastics in decorations and ornaments for Christmas is almost unlimited. Free from the fragility of glass, permanently colorful, adaptable to mass-production molding in intricate and delicate designs, plastics bring to this huge market many advantages never before made available by any group of materials. The accompanying photographs depict a wide variety of decorations currently being produced. Every effort has been made to make these illustrations representative of the field. Obviously, not every size and shape of available ornament and decoration could be included; rather, the illustrations were selected to show present progress and to serve as a series of keys to future possibilities.

Sun Glasses Adjust for Light



Sketch, above, shows how variable sun glasses work. Eye looks out through two light-control lenses. Front lens is fixed, while rear lens rotates. When "optical slots" of each lens are lined up, maximum amount of light reaches eye. As slots cross, amount of light is reduced

ALL PHOTOS COURTESY PIONEER SCIENTIFIC CORP.

Light varies from maximum when metal tab is in bottom position (left) to near-darkness when tab raises 90° (right)

A RESEARCH project undertaken by Polaroid Corp. of Cambridge, Mass., prior to World War II resulted in a sun glass lens which, when applied to a special goggle, proved to be of great value for anti-aircraft gunners during that war. Now several years after the war and after considerable additional development work on the part of both Polaroid and Pioneer Scientific Corp., New York, N. Y., this wartime development has made possible the new Variable Light Sun Glass.

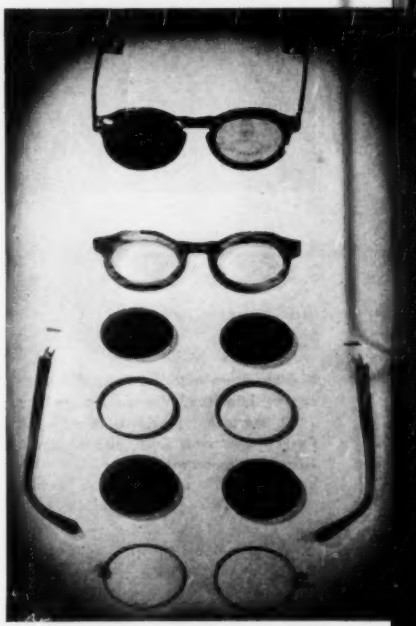
These new glasses differ from conventional Polaroid sun glasses in that they have four polarizing lenses, two in each lens cell. The front element of each lens is fixed in position and the rear element is rotatable through a 90° arc simply by moving a small metal tab set on the under side of each rim of the frame. The rotation of these lenses results in a gradual variation from maximum brightness when the tab is at the bottom, to practically full darkness when the tab is at the other extreme.

Each of the four lenses is made up of five different components. The center element is a thin layer of polarizing film which is laminated between two sheets of cellulose acetate butyrate. These sheets in turn are coated on their outer surfaces by a hard scratch-resistant coating, known as the Polaroid S-10 surface, produced by adding a thin layer of a special melamine resin to one surface of a butyrate sheeting. After the complete laminate is made, the sheets—30 in. wide and 0.03 in. thick—are slit into strips of the proper width for producing the size lens required.

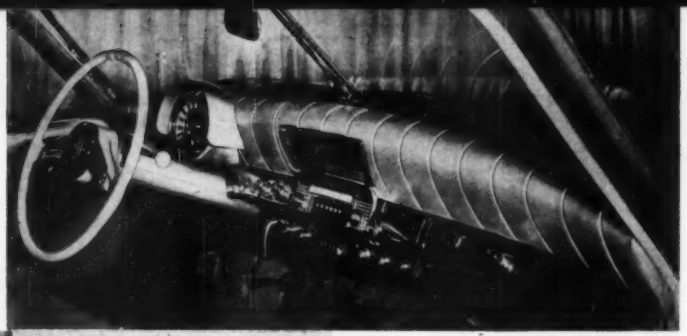
The strips of laminated material, in coil form, are fed through an automatic die to produce flat lens blanks, which are then formed to shape in a special automatic machine designed and produced by Polaroid. This machine is equipped with multiple molds which are so constructed that they may be heated and chilled very quickly.

The optical excellence of the lenses is obtained by forming the plastic blanks between perfectly ground and polished glass molds under heat and pressure.

The finished lenses produced by Polaroid are then shipped to the Pioneer Scientific Corp., New York, N. Y., which assembles them into the completed Variable Light Sun Glasses.



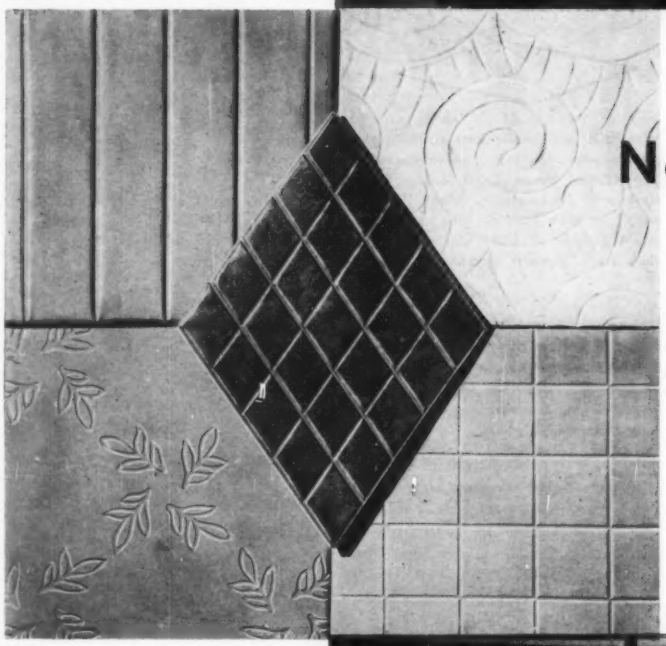
Polarizing lenses (third and fifth rows from top) consist of film laminated between two sheets of cellulose acetate butyrate whose outer surfaces are melamine coated



COURTESY KAISER-FRAZER CORP.

Quilted vinyl "crash pad" of Kaiser deluxe model is in channel pattern

Below: Diamond in center was original stitchless quilted vinyl pattern. New patterns (reading counter-clockwise from lower left) are trellis, tile, scroll, and channel



New Patterns

WHEN it was introduced less than two years ago, the stitchless quilted vinyl upholstery and wall covering material known as Sealtuft was available in only one pattern—a 2- by 3-in. diamond.[1] Since that time Sealtuft has found numerous applications, and four additional patterns have recently been introduced to the market.

Sealtuft, made by The Jason Corp., Hoboken, N. J., is quilted by electronically heat-sealing two vinyl

1 "Stitchless Quilted Vinyl," MODERN PLASTICS 26, 98 (Nov. 1948).

Scroll pattern material is used on bar of Sky Line Inn, Vermont, owned by J. D. Davidson, president, Carbide & Carbon Chemicals Corp. Fire-retardant filler is important safety factor in quilted vinyl's use in public places

PHOTOS COURTESY KAISER-FRAZER CORP.

End pieces of quilted vinyl cover for Kaiser dashboard are sewn to main piece of pad. Heavy cellulose filler is used

Finished pad is affixed to metal dash panel with clips. Pad has face sheet of 20-mil vinyl; back sheet is of 4-mil film

in Stitchless Quilted Vinyl

sheets to each other through a cellulose filler. The front sheet is Boltaflex, Duran, or Vinylite sheet between 8 and 20 mils thick, either plain or embossed to resemble leather, moire, taffeta, or sharkskin. The back sheet in the Sealtuft upholstery material is 4-mil clear vinyl film. The wall covering material has a back sheet of heavy vinyl-impregnated paper.

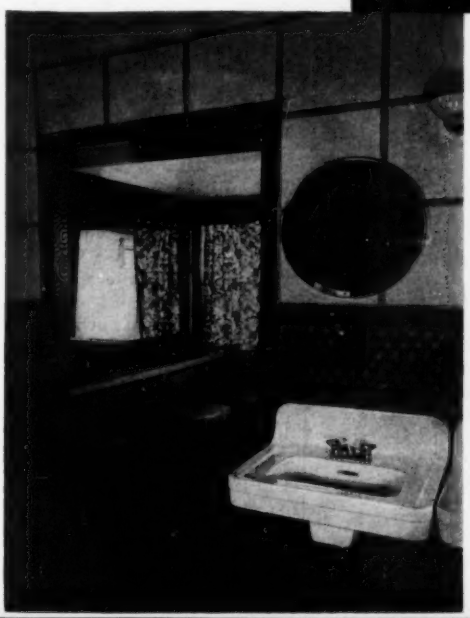
The fire-retardant cellulose filler is compressed at the points where the material is sealed so that the finished sandwich is only slightly thicker at those points than the combined thickness of the two vinyl sheets. At other places, the thickness of the Sealtuft equals the combined thickness of the two vinyl sheets plus the thickness of the uncompressed filler.

The end result is a rich-looking material, thickly quilted. The use of electronic sealing instead of stitching insures a uniform pattern and preserves the waterproof quality of the vinyl sheeting. The pattern of the seal, the thickness of the vinyl face sheet, and the thickness of the filler can all be varied to suit the particular application.

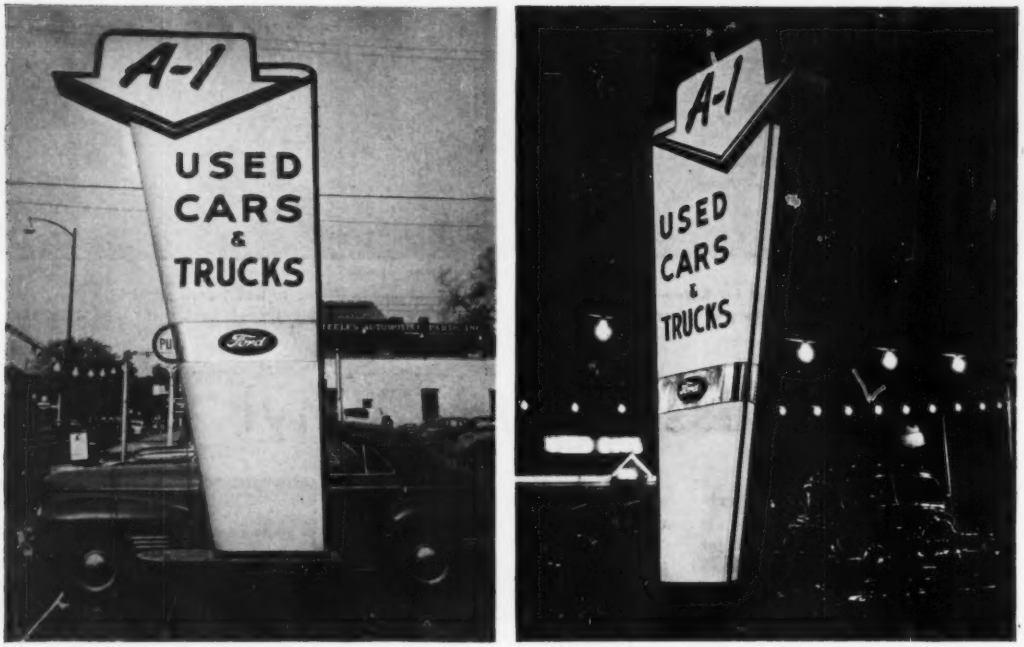
The new tile pattern Sealtuft is much like the original diamond pattern. It is made up of simple squares. The trellis pattern is made up of small sprigs of leaves arranged in a diamond pattern. The channel pattern is made up of straight bar seals 2½ in. apart. The most complicated of the new patterns is the scroll pattern, which is made up of a series of swirls and curved lines.

One of the most interesting applications of the new Sealtuft channel pattern is the "crash pad" which covers the dashboard of the 1951 Kaiser deluxe. The material is specially made for Kaiser and has a heavier filler than is usually used. The face sheet is 20-mil Chukker Tan Duran and the back sheet is 4-mil clear Ultron film. After the end pieces are sewn to the main piece of the pad, the finished pad is affixed to the metal dash panel with clips. Glue is used only around the openings in the pad for the radio speaker and for the instrument cluster.

Chair back is covered with tile-patterned quilted vinyl. Electronic sealing insures a uniform design and attractive appearance



Waterproof quality of quilted vinyl, used here in both scroll and original diamond patterns, makes material practical for lavatory installation.



ALL PHOTOS COURTESY ROHM & HAAS CO.

Largest colored plastic sheets ever cast form parts of Ford acrylic display pylon which shines in sunlight, is brightly lit at night. Translucent shell is yellow, letters are red; and arrow bearing "A-1" symbol is red, white, and blue

Acrylic Lighthouses for Ford

Motor car company approves huge advertising beacons to identify used car lots from coast to coast

THE fast growth of acrylic in the sign industry is emphasized powerfully by the towering new pylons of acrylic which will identify the used car and truck lots of Ford dealers. The pylons, nearly 18 ft. high when mounted on concrete bases, merit a series of superlatives over and above sheer size: the program includes the largest mass-produced display ever built of Rohm & Haas Plexiglas; portions of the pylons are formed from the largest colored plastic sheets ever cast; and the program represents the biggest single development in plastic signs ever undertaken by a national advertiser.

Two other factors are significant to the plastics industry: First, the completely luminous pylon costs the dealers 5% less than the same size display in porcelain enamel with neon lettering; second, development of the design and construction of the signs involves a co-operative effort by several plastics fabricating firms.

Acrylic 0.187 in. Thick

Basically triangular, the pylons taper from an 8-ft. width at the top to 3 ft. at the bottom. Substantially, they are shells of yellow translucent acrylic, 0.187 in. thick, mounted on a frame of 2-in. angle irons. All exposed metal is stainless steel. The yellow body is surmounted by a red, white, and blue arrow bearing the symbol "A-1"—the identification insignia which is associated with the used car and truck lot of a Ford dealer.

With the pylon enclosing all lighting elements, the display becomes completely luminous at night, identifying the dealer's place of business in exactly the same shape and

color, night or day. Maintenance costs are low. The Plexiglas shell of the pylon needs only an occasional washing to preserve its freshness and brilliance. For lighting, 10 standard Slimline tubes are mounted vertically in the body, and 11 100-watt incandescent bulbs flash on and off in the big arrow at the top. In all, 2000 watts illuminate 175 sq. ft. of plastic surface. Average current cost is estimated at seven cents per hour, and all lamps can be replaced for less than $20; moreover, this service can be done by the dealer's own maintenance man.

Because of the long life of the Slimline tubes and the low current consumption of the whole system, many dealers have indicated plans to keep the pylons lighted day and night—getting maximum brilliance on cloudy, dull days as well as after dark. Under sunlight, the natural gleam and sparkle of the acrylic serve amply to attract the attention of potential buyers.

The two sections of the pylon—body and arrow—represent different techniques in plastic-sign construction. The body uses yellow translucent material of solid color throughout; each body uses two 67- by 79-in. sheets and one measuring 67 by 102 inches. Red letters cemented on the yellow body are flat cutout from translucent Plexiglas #2415, 0.060-in. thick. The "A-1" arrow section of the pylon is made of clear Plexiglas II, approximately 86 by 41 inches. The heat-resistant acrylic is specified here to provide an ample safety factor against heat generated by the flashing incandescent bulbs.

The "A-1" arrow, with its raised red letters and white background, and the traditional Ford oval in the metal band across the center, are formed from single sheets of clear acrylic on whose back surfaces the appropriate colors and copy are silk-screened. That is, the color of

Dealers

One of the first operations in producing acrylic display sign is heating sheet in oven until it reaches the appropriate temperature for forming

When acrylic sheet is properly heated, it is clamped onto wooden form and allowed to cool. Sheet holds shape after cooling

Red letters are die-cut from translucent sheet stock 0.060 in. thick and are bonded to yellow body sheet

In fastening acrylic sheet to framework, strip of ½- by ½-in. acrylic is glued to inside of leading edge of each sheet. Strip on each of two curved sheets fits loosely into channel. Stainless strip is bolted through space between sheets and strips to channel welded to pylon frame

Specials are highlighted by interior-lighted sign with red and black letters on solid yellow background

these parts is seen through the transparent material.

Seeking constantly to aid its dealers in used-car operations as well as new-car sales, the Ford organization encourages the planning and equipping of used-car lots as thoughtfully as the showrooms. The "outdoor showrooms," it is felt, should bear a common resemblance, coast to coast, to win immediate public recognition. Accordingly, the Used Car and Truck Sales Dept. of Ford Motor Co. has made it possible for dealers to have a complete array of integrated merchandising aids. These include colorful, animated signs and displays, banners, lot-layout plans, and detailed instructions for their use. More than a year's intensive development went into the program.

Ford, although already familiar with the success of acrylic in the sign field, adhered naturally to its traditional "let's find out for ourselves" policy when it came to recommending a new type of sign. Thus the pylon was developed through cooperation between the Ford organization, Rohm & Haas Co., and sign manufacturers. The W. B. Ford Design Corp., Detroit, furnished the basic design. Initial details were worked out between the Ford Motor Co.'s engineering department and the design and fabrication staff of Rohm & Haas. Then Neon Products, Inc., Lima, Ohio, built full-size sample pylons for test installations, and engineered the construction and lighting methods to be followed. As the project developed, two other manufacturers —Steiner Plastics Mfg. Co., Long Island City, N. Y., and The Lackner Co., Cincinnati, Ohio—built additional test pylons. Features from all these experimental models were incorporated in the final composite pylon design.

Weathers Winters

Months of testing preceded the go-ahead signal. In Detroit, for example, a Plexiglas pylon not only weathered a Michigan winter without damage, but also withstood a 65-m.p.h. gale. This performance came as no surprise, because designers engineered the pylons to resist wind pressures of 30 lb./sq. ft. of surface area. Inherently, too, the acrylic ranks as almost totally resistant to extremes of weather.

As installed, each pylon rests on a base of concrete, decoratively sheathed in steel, to lift the plastic above bumper height. Tests indicate that the 0.187-in. thick material will withstand accidental rough treatment, including impact from flying pebbles and other abuse to be expected from outdoor exposure in busy commercial areas. In this thickness, a foot-square sheet of the material, supported horizontally, remained undamaged when struck by a ¼-lb. steel ball which had been dropped 22 feet.

As soon as it was clear that the pylon would pass all tests, Plexiglas was specified for other plastic signs developed as part of Ford's overall "showmanship" program. New designs came thick and fast. Separate "A-1" arrows—both single-face and double-face—for mounting on poles, on walls of buildings, or for suspension from wires above the lots, were developed in two sizes —7 ft. 6 in. by 3 ft. 6 in. and 4 ft. 6 in. by 2 feet. Like the pylon arrows, these can flash on and off to draw attention to the sales area. They, too, are supplied by the Neon Products, Steiner, and Lackner companies. There are also similar non-flashing arrows for spot decoration which are being manufactured by Cincinnati Advertising Co.

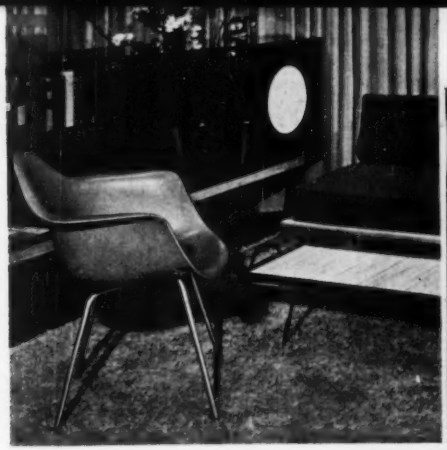
Vertical white acrylic tubes, lighted inside and bearing in red silk-screening such legends as "Entrance," "Drive In," etc., are being produced by Neon Products, Inc., to serve as direction posts and to provide supplementary illumination throughout a lot. The same company supplies large rectangular signs—9½ ft. long and nearly 3 ft. high—with white faces and red reproductions of the arrow design or the dealer's name. These may be mounted singly, or grouped to form a long valence which becomes a spectacularly broad luminous band of lighted copy across any desired section of the lot.

Other Ford Signs

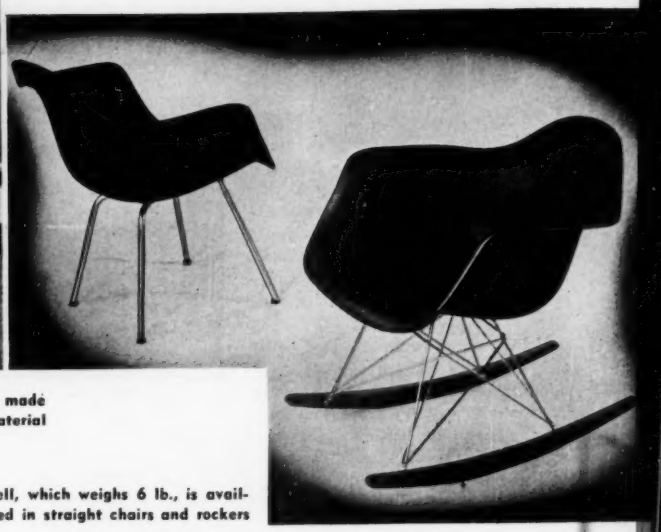
Dealers will be aided, too, to spotlight an unusual value in a used car or truck. To accomplish this, a double faced rectangular canopy sign was developed, with red and black letters spelling "Today's Special" against a solid yellow background. Like all the Plexiglas signs in the program, this is interior lighted. Faces are slanted inward to meet along their bottom edges. These signs, mounted on an adjustable pipe stand on which featured cars are displayed, are supplied by Myer Display Co. located in Milwaukee, Wis.

Also, the Ford organization is encouraging dealers to provide parking spaces for customers, and to use bulls-eye signs that call motorists' attention to this convenience. These signs, double faced and about 2 ft. in diameter, are lighted from inside with two 100-watt incandescent bulbs. They are made by Prestyle Mfg. Co., Detroit, Mich., which is also producing acrylic-faced electric clocks for outdoor use on the lots.

All items carry Underwriters' Laboratories and union labels. The entire program is being merchandised to dealers with elaborate four-color brochures, which contain complete instructions and include suggestions for custom-built backlighted canopies and valances to join showroom and used car lot, for example. Also suggested, for lots with narrow frontage in the center of a block, is a corrugated yellow Plexiglas facade to span the frontage, with a single large "A-1" arrow flashing in the center.



Seat, arms, and back of prize-winning modern chair are made of a single piece of glass-fiber-reinforced polyester material



Gracefully designed chair shell, which weighs 6 lb., is available in four colors and is used in straight chairs and rockers

Polyester Chair Takes the Prize

ONE of the most significant recent advances made by plastics in the furniture field was recognized by the award given to a plastic chair in the low-cost furniture competition of the Museum of Modern Art. The chair, which won one of the top prizes in competition with products of over 3000 designers from 31 countries, was designed by Charles Eames and is manufactured by Herman Miller Furniture Co., Zeeland, Mich.

The seat, arms, and back of the new Eames chair are formed from a single piece of Zenaloy, a Fiberglas-reinforced polyester material, by Zenith Plastics Co., Gardena, Calif.

Preforms Used

A preform technique is used in molding the chair shell. The glass fibers, supplied in 2½-in. lengths by Owens-Corning Fiberglas Corp., Toledo, Ohio, are accumulated on a preform screen by suction, and are then placed in a metal mold along with the pigmented polyester resin. Both resin and pigments are supplied by Pittsburgh Plate Glass Co., Pittsburgh, Pa.

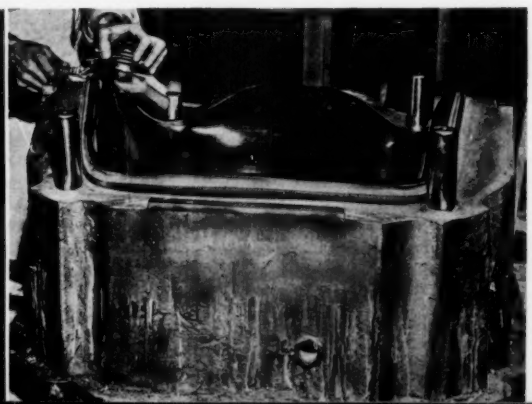
The chair shell, which weighs 6 lb., is then molded under 100 to 150 p.s.i. pressure at 260° F. The molding cycle is 3 min., and sanding off the flash is the only finishing required after the piece comes from the mold.

One of the main problems in the production of the chair shell was how to make a preform which would produce a thick molded bead around the perimeter of the shell,

(*Continued on p.* 147)

Mesh form receives glass fiber in preforming. Suction fans pull glass fiber to mesh, and resins bond them into shell

Workman polishes the female die used in manufacturing polyester chair. Shell is molded under 100 to 150 p.s.i. in a 3-min. cycle



S.P.I. Film and Sheeting Conference

THE First Conference of the Plastics Film, Sheeting and Coated Fabrics Div. of S.P.I. was held at the Hotel Commodore, New York, on May 25 and 26, 1950. More than 350 representatives of various branches of the industry attended, and the meeting was generally considered one of the most successful in the history of S.P.I.

George A. Fowles, B. F. Goodrich Chemical Co., presided at the opening session of the conference. The activities of S.P.I., particularly in the field of setting minimum standards for specific products, were outlined by William T. Cruse, executive vice-president of S.P.I.

For those readers who did not attend the S.P.I. conference on film, sheeting, and coated fabrics, the accompanying report will give the highlights of the papers presented. This running story of the conference brings up-to-date the record of progress and trends in this rapidly expanding segment of the plastics industry.

Calenders and Calendering

Donald C. Chase, Farrel-Birmingham Co., Inc., spoke on "Trends in Calenders and Calendering." Mr. Chase discussed the "definite trend toward careful sifting and pre-blending, using automatic equipment." He also pointed out the trend toward four-roll units of inverted L or Z design instead of converted three-roll rubber calenders.

Mr. Chase discussed the problem of maintaining uniform temperatures in all parts of the calender as a factor in accurate vinyl calendering. He also mentioned the trend toward higher speeds, wider widths, thinner gages, heavier rolls.

An interesting sidelight to the speech was Mr. Chase's answer to the question, asked by a member of the audience: "What is the thinnest film which can be calendered?" Mr. Chase said that 3½-mil film was the thinnest being calendered in actual production, but that his company expected that 2-mil film would soon be calendered. He also remarked that ½-mil film has been calendered (on an experimental basis) in his firm's laboratory.

Vinyl Stabilizers

H. J. Ratti, National Lead Co., spoke on "Vinyl Stabilizers." Mr. Ratti began by analyzing what happens when polyvinyl chloride degrades. On the basis of the analysis, he defined an ideal stabilizer system as one which embodies: 1) a hydrogen chloride acceptor, 2) reactive dienophilic molecules, 3) an antioxidant, and 4) an ultra-violet light screen.

Mr. Ratti then analyzed the various types of stabilizers available, with particularly detailed consideration of lead stabilizers. He outlined the vinyl stabilizer development program of National Lead Co. and reported the results of tests.

Style in Fabrics

Frank J. Groten, Firestone Plastics Co., presided at the luncheon session on May 25. The main speaker at this session was David Silman, Cohn-Hall-Marx Co., who spoke on "The Style Approach to Plastics Fabrics." Mr. Silman pointed out how producers of conventional fabrics had increased their markets through the use of styling and indicated how manufacturers of plastics fabrics could follow their example. He emphasized the complexity of the styling problem and pointed out the necessity of making use of the right type of stylists and colorists if the job is to be successful.

The remainder of the luncheon meeting was devoted to the reports of the 11 technical committees set up to develop standard testing methods for evaluating the quality of plastics film and sheeting.

Printing on Vinyl

Albert J. Hanley, Respro Inc., presided at the morning session on May 26. The first paper, "A Review of Vinyl Printing," was delivered by Chester M. Robbins, Interchemical Corp. Mr. Robbins cited estimates that 190 million lb. of film and sheeting will be produced in 1950 and that 125 million lb. of it will be printed. He then briefly described the various methods of printing on vinyl.

Gravure printing, according to Mr. Robbins, is still the number one method, both in yards printed and in the number of machines in use. About 65% of gravure vinyl printing is done on the textile or drum-type machine, but the trend seems to be toward the unit-type machine. This consists of individual printing units set behind each other so that each color can be printed and dried before the next color is applied.

The use of surface or wall paper print machines for printing vinyl film is the most important development in the field in the past year, Mr. Robbins said. More than 25 million yd. have been printed in this manner since last August, and the volume is increasing rapidly. The most important reasons for the increasing popularity of this method are that up to 12 separate full tone colors are available, and that hand-blocked or hand-painted decorations can be simulated.

The so-called aniline printing method seems to have a great future, mainly because it is the most versatile method.

Upholstery

The viewpoint of an end user of vinyl sheeting was vigorously presented by J. William Brenner, president of William Brenner Furniture Corp. His talk was entitled "What the Furniture Manufacturer Expects of Vinyl Types of Upholstery Materials."

Mr. Brenner said that his company has produced vinyl-upholstered furniture since vinyls came on the market and that such furniture now accounts for about 15% of his business. Mr. Brenner traced the early history of vinyls in the upholstery field and reminded his audience of some of the mistakes of those days —such as making extravagant claims for the material, using too thin a material over deep springing, etc. He pointed out that some

(*Continued on p.* 147)

Squeezable polyethylene bottles molded in shape of puppies contain children's toiletries, are sold "in the dog house" —die-cut openings in the cartons giving a kennel effect. Bottles derive the appearance of color from the contents

Latest Squeeze Bottle Designs

THE versatility of the polyethylene squeeze bottle and its adaptability to the production of unusual packages are strikingly illustrated by two recent applications in the children's toiletry field. Both are molded by Elmer E. Mills Corp., Chicago.

Manon Freres, Inc., New York, N. Y., is using a 4-oz. Mills polyethylene bottle molded in the shape of a puppy dog with a wistful expression on his face. The bottle is produced in the natural color of polyethylene; its contents include: children's cologne, bath powder, bubble bath, or shampoo. Urea screw closures are supplied by W. Braun Co., Chicago.

The puppies, with tags around their necks to announce their contents, are packaged either singly or in sets in cartons with die-cut openings giving the effect of kennels.

Another unusual squeeze bottle is being molded by Elmer Mills for Helene Pessl, Inc., New York. This company makes a line of children's toiletries which are sold under the trade name of Little Lady. Mills has reproduced the design of the Little Lady trade mark in a polyethylene squeeze bottle used to package Little Lady cologne.

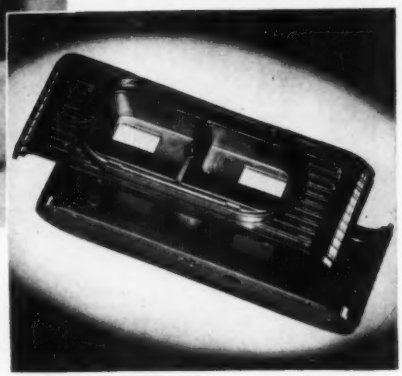
The bottle holds 8 oz. of cologne; an average of 1500 spray applications can be made before the contents are exhausted. The bottle is molded in flesh color; bright red and yellow clothes are hand-painted on by Helene Pessl. The screw closure, a broad-brimmed yellow hat, is molded of polyethylene by Hopewell Plastics Corp., Millbrook, N.Y.

The finished cologne package has added sales appeal because of its tie-in with the company's trade mark, its colorful appearance, and its play value.

Hand-painted doll bottle holds cologne, has polyethylene closure

Stereoscopic camera has body and view finder molded of medium-impact, high-finish phenolic. Ovoid front and cover plates are of coated sheet aluminum

COURTESY DICKTEN & MASCH MFG. CO.



Two molded parts of camera case have non-reflecting inner surfaces

AN important photographic development of the postwar period has been the growing public interest in cameras designed to take pairs of stereoscopic color transparencies. Such a camera is basically more expensive than standard types because its lens and shutter systems are in duplicate. In addition, the entire camera must be unusually well engineered and constructed to insure that the lens and shutter function in perfect synchronization.

When James W. Currie set out to develop a high quality stereoscopic camera to sell for less than $100, he knew that intelligent use of plastics could help him reach this objective. He planned on using a molded phenolic housing, and cooperated closely with a custom molder on such details as material selection and mold design. The fruit of their combined efforts is the new Videon three-dimensional camera, produced by Stereocrafters, Inc., Milwaukee, with molded parts produced by Dickten & Masch Mfg. Co., Milwaukee, Wis.

The Videon is compact and easy to operate. It uses standard 35mm. film in either 20 or 36 exposure rolls, yielding 16 complete stereoscopic pictures from the smaller roll and 29 from the larger. The transparencies are mounted on stereoscopic slide masks for 1⅝ by 4-in. viewers. The camera has matched f3.5 lenses, coated for brilliant performance, single-control focusing, and a self-cocking Synchro-Stereo shutter with automatic speeds from 1/10 to 1/100 second.

In construction, the Videon is a well-balanced combination of plastic and metal. The mating sections of the camera body, as well as the view-finder assembly, are molded of medium-impact, high-finish Durez phenolic material. The ovoid front of the camera, through which the twin lenses project, and the top and bottom cover plates, are formed of coated sheet aluminum.

The importance of the plastic body in keeping the price of the Videon down can best be illustrated by comparing it to a hypothetical camera made of die-cast aluminum. Such a camera, Mr. Currie estimates, would have required approximately five man-hours of labor for "preparing and finishing" the casting—including such operations as coring, drilling, reaming, tapping, and covering with leather.

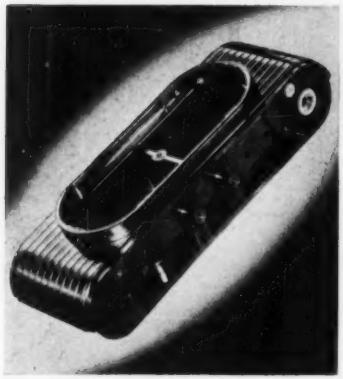
The plastic parts, on the other hand, require about 1/10 man-hour for operations involving flashing the molded pieces, drilling 12 holes, and tapping one. No supplementary exterior covering is required because the ribbed, easily-gripped surface of the moldings has a glossy black finish. The hard surface of the phenolic material is also good insurance against scratches and similar damage. Economies obtained with the molded plastic body, plus simplification of the camera mechanism to reduce the number of parts to a minimum, made it possible to place the Videon on the market at $99.50.

The custom molder, Dickten & Masch Mfg. Co., also made the molds used. The two parts of the body are transfer molded in a two-cavity die. The two view-finder parts are compression molded in a four-cavity die.

The heaviest and most complex piece is the front section of the body, on which the principal working parts of the camera are mounted. It contains numerous recesses in both its upper and lower surface which enclose functional parts of the camera. These recesses constitute large undercuts which might have been produced by means of a cam action on the mold, increasing die cost and delaying initial production. Instead, the undercuts are produced by removable mold inserts which carry all side core details. The inserts are located in side rails which are ejected at the end of the curing cycle, along with the pieces. The press operator merely withdraws the side rails from the molded parts and replaces them in the mold before starting the next cycle.

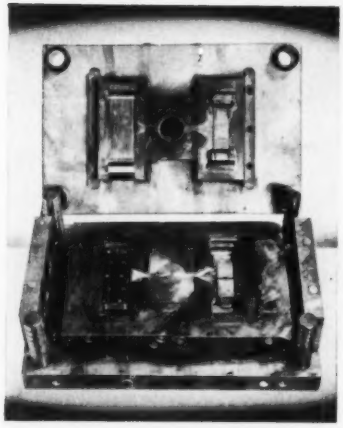
Cuts Camera Costs

The use of molded phenolic parts makes a low-priced stereoscopic camera possible



COURTESY DICKTEN & MASCH MFG. CO.

Main piece has inserts and recesses molded-in for working parts



COURTESY DICKTEN & MASCH MFG. CO.

Two-cavity die in which front and back sections are plunger molded

The preformed phenolic material is preheated for approximately 30 sec. on a 2-kw. electronic preheater. Total weight of the charge for body and cover pieces is 240 grams. The press used, constructed by the molder, is a 250-ton top-plunger ram type. Molding is done at a pressure of 100 tons on the lower ram and 20 tons on the top ram. The cycle on the camera body parts is about 2½ minutes.

All details necessary for light exclusion in the finished camera are molded into the plastic parts. An example is the tongue and groove construction which insures a light-tight fit between the two body halves. A non-reflecting surface on some of the inner areas of the body is obtained by vapor-blasting the necessary cores. This gives the molded part a satin-like finish which guards against interior light reflections and poor picture quality.

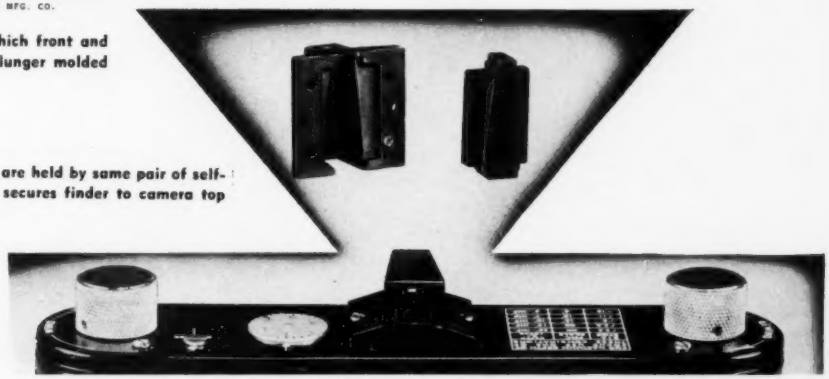
Four holes cored in the main body casting serve to locate important mechanisms in the camera. Openings for the tripod socket and back lock are also cored directly in the mold. Two metal inserts are included in the main body casting. The larger of these is a heavy-duty bearing which requires a machining operation. The smaller insert just ahead of this bearing serves as a cover plate retainer and also forms a bearing for a moving part.

Four studs on the inner surface of the back provide anchorage for coil springs which support a metal film pressure plate in position. Another small boss on the bottom of the front piece locates a metal plate which forms a bearing for the film spool and sprocket.

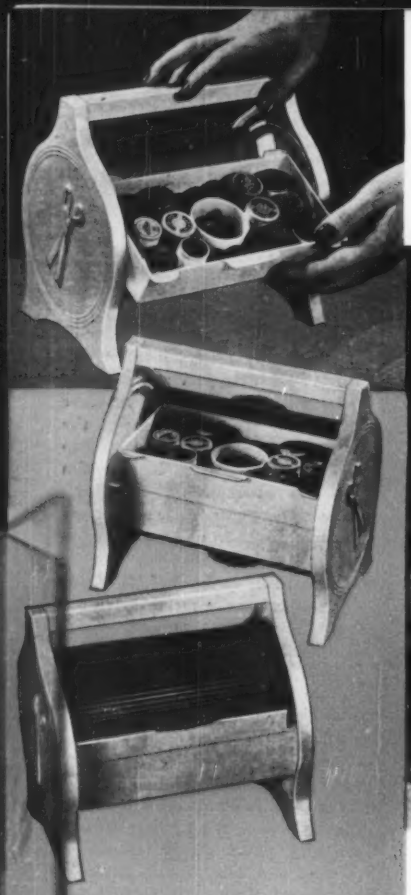
Finishing operations are relatively simple. Holes to be drilled are located by molded "dimples" having the same taper as the drill bit. These provide locations accurate to within plus or minus 0.003 in. without the need for fixtures.

The Videon view finder consists of an outer shell and a lens retainer, so designed that they are held together by the same pair of self-tapping screws which hold the finder to the body of the camera. The base of the finder, cored to accept the screws, has internal slots in each end which retain the round eye lens and the square objective lens when the lens retainer is slipped in place.

At the present time, Stereocrafters, Inc., is not producing a companion slide viewer to go with the Videon camera. Instructions accompanying the camera point out that satisfactory viewers are already on the market.

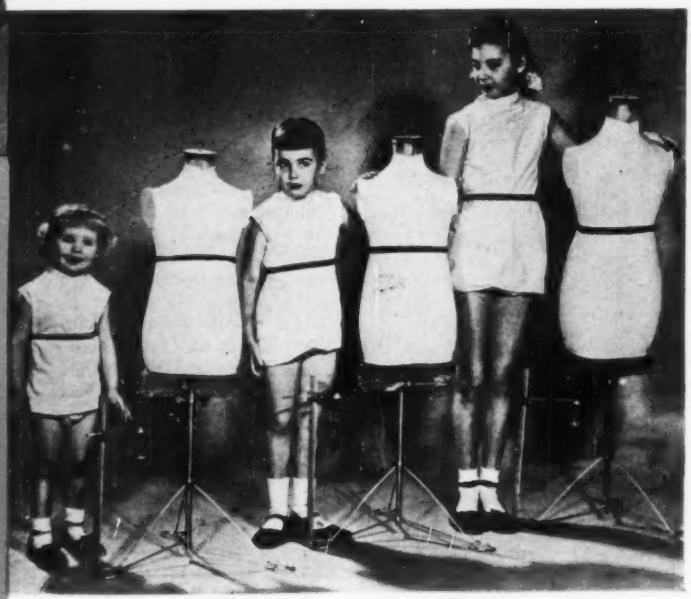


Parts of view finder are held by same pair of self-tapping screws that secures finder to camera top

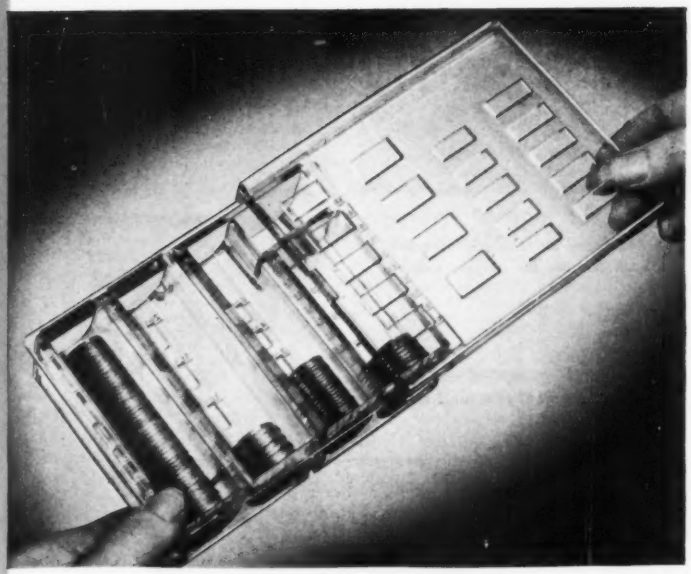


Above—Sewing box molded of Bakelite styrene has convenient roll-top lid like the one on grandpa's desk. Removable tray holds spools and other small items. Large top handle makes the box easily portable. Ivory box is made with red or green top by Best Plastics Corp., 6014 11th Ave., Brooklyn, N. Y.

Below—Inflatable dress forms made of Vinylite film are adjustable and can grow with the child. Muslin cover is stitched to the correct size so that the inflated form duplicates the child's measurements. Form can be deflated easily for compact storage. Accidental pin punctures can be repaired easily with patching tape. Available in three sizes, the forms are manufactured by Barbera Originals, Inc., 38 E. 19th Street, New York 3, N. Y.

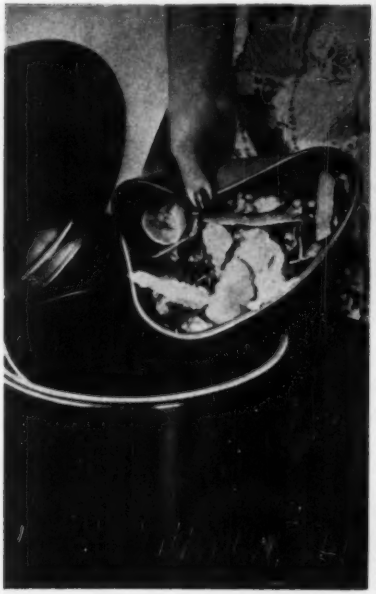


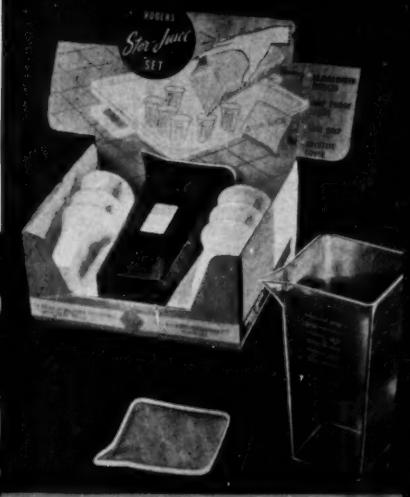
PLASTICS



Right—Visual Coin Box molded of transparent Tenite II cellulose acetate butyrate expedites the handling of change in department and chain stores. At the end of day's business, clerk places coins from cash drawer in the box, which has four columns — for pennies, nickels, dimes, and quarters. Calibrations on box show the cumulative value of coins in each column, reducing check-out time. The butyrate box is molded by Sameric, Inc., Riverdale, N. J., for Visual Coin Box Co., Box 255, Metuchen, N.J.

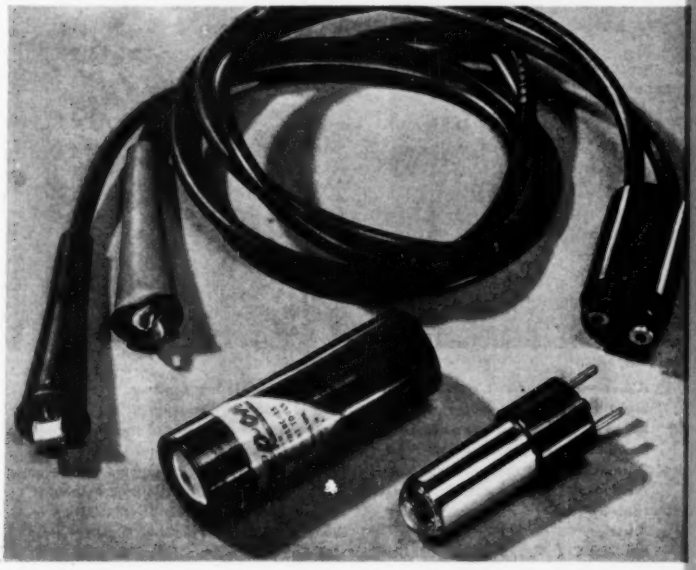
Below—Flexible, dip-proof sink strainer is molded of Bakelite polyethylene. The flexibility of the strainer makes it easy to guide contents by squeezing the sides of the strainer when emptying. When carried in tilted position, no liquid runs out of the drain holes. The strainer can be cleaned with soap and warm water, and will not warp in hot water. It is manufactured by All-Power Mfg. Co., 202 Roosevelt Ave., Montebello, Calif.





Above—Stor-Juice, a 32-oz. container molded of styrene, has cover molded of polyethylene. Groove molded into the cover snap-fits over beaded top edge of container to form an air-tight seal. Container can thus be used to mix as well as store concentrated fruit juices or baby's formula. Stor-Juice is sold separately or packaged as a set with six polyethylene juice glasses. Made by Rogers Plastic Corp., West Warren, Mass.

PRODUCTS



Left—Automobile timing light can be disassembled easily for repair or replacement of the neon tube. Two halves of the case are molded of Durez phenolic, have molded-in threads so that they can be screwed together. The phenolic case is self-insulating, has high impact strength, and withstands heat. The case is molded by Rockford Molded Products, Inc., Rockford, Ill. The light is made by Snap-On Tools Corp., Kenosha, Wis.

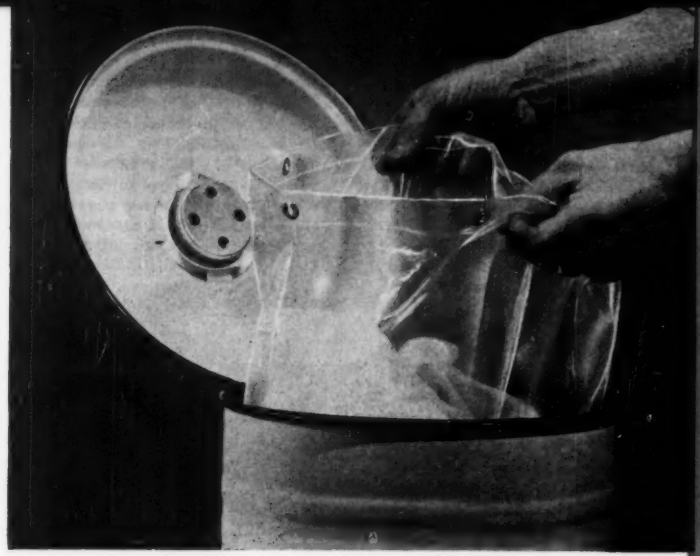
Right—The handy tuft protruding from the top of the Cotton Picker dispenser package is protected from dust and dirt by a transparent cover molded of Bakelite styrene. The plastic cover can also be turned over and used as a shallow dish to hold liquids such as home permanent wave solution for application with the cotton. Plastic tops are molded by Chicago Molded Products Corp., 1020 N. Kolmar Ave., Chicago, Ill., for dispenser packages made by Bauer & Black Div., Kendall Co., 2550 S. Dearborn St., Chicago

PLASTICS

Below—Outer case of oil-bath air cleaner for fractional horsepower gasoline motors is molded of transparent Tenite II cellulose acetate butyrate. Transparency of the case permits visual check of the oil level and the condition of the oil. The case holds a metal filter unit which cleans air before it enters the carburetor. The butyrate outer case is molded by PlaSticks, Inc., 2743 W. 24th St., Chicago, Ill., for United Air Cleaner Div., United Specialties Co., 2705 Cottage Grove Ave., Chicago 28, Ill.

Above—Hollywood Liquefier has eight blades which revolve at high speed to reduce raw vegetables to a sediment-free liquid in less than 2 minutes. Transparent bowl is molded of Lumarith cellulose acetate by Modern Plastics Co., Los Angeles, Calif., for Hollywood Liquefier Co., S. Pasadena, Calif.

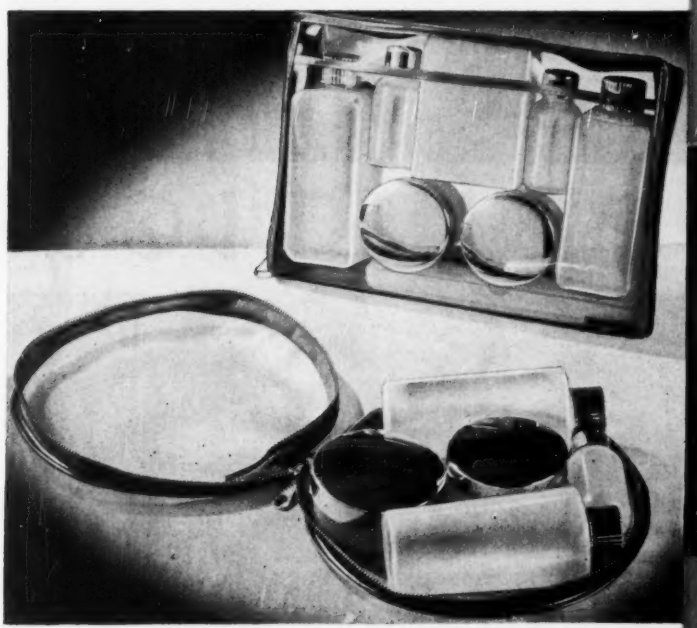
Above—Maximum comfort in the bath tub is made possible by inflatable bath lounge made of Vinylite film. The lounge weighs a little more than 1 lb. and has a comfortable seat, back support, and head rest. Suction cups on the bottom hold it in place on the bottom of tub. Made in pink, white, or blue by Luxury Gifts, Inc., 516 Fifth Ave., New York 18, N. Y.



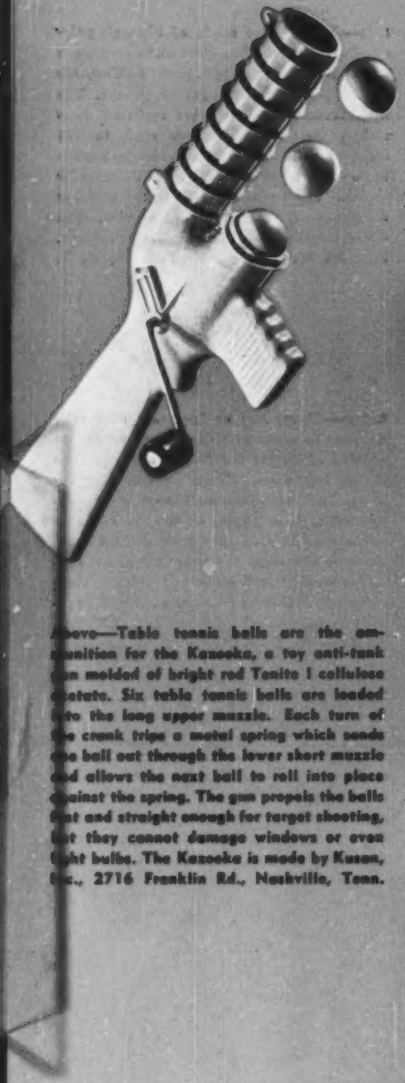
Left—Diaper bags made of Plexpak polyethylene film cost less than cloth sacks, are less than half the weight, resist mildew, are moisture-proof, and are stain-resistant. The bags reduce odors, prevent moisture from soiling floors, and do not stick to the diaper can. The polyethylene bags are made in two sizes, 19½ by 30 in. and 22½ by 30 inches. The opening is reinforced and has six grommets for a pull cord or pins. The diaper bags are made by Dependable Products, Inc., 32 W. 22 St., New York 10, N. Y.

PRODUCTS

Below—Clover-leaf or fan-tan butter rolls are easy to make with the Kenco Roll Cutter molded of Tenite I cellulose acetate. The cutter has three blades on one side for clover-leaf rolls, four on the other for fan-tan rolls. The blades of the desired size are dipped in flour and then pushed down through the dough to the bottom of the cup. Holes molded in the center plate facilitate removal. Molded by Chicago Molded Products Corp., 1020 N. Kolmar Ave., Chicago for Kenco Co., 5614 Blackstone Ave., Chicago



Above—Travel kits are fabricated of transparent or translucent 20-gage Vinylite film and contain blow-molded polyethylene squeeze bottles and molded polyethylene jars. Larger kit also contains molded polyethylene tooth-brush holder and soap dish. The finished kits are compact and extremely light in weight. The small bottles in the kits hold 1 oz., the large ones hold 6 ounces. Both sizes of bottles are made by Plax Corp., P. O. Box 1019, Hartford 1, Conn. The kits are sold by Lion Mercantile Corp., 326 W. 55 St., New York 19, N. Y.

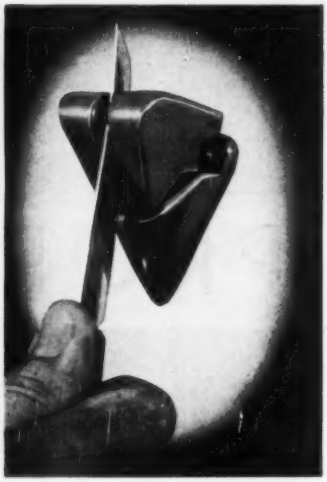


Above—Table tennis balls are the ammunition for the Kazooka, a toy anti-tank gun molded of bright red Tenite I cellulose acetate. Six table tennis balls are loaded into the long upper muzzle. Each turn of the crank trips a metal spring which sends one ball out through the lower short muzzle and allows the next ball to roll into place against the spring. The gun propels the balls fast and straight enough for target shooting, but they cannot damage windows or even light bulbs. The Kazooka is made by Kusan, Inc., 2716 Franklin Rd., Nashville, Tenn.

Right—Durable index tab holders for vertical file guides and executive file-folder desk sets are extruded of clear Tenite II cellulose acetate butyrate. The holder has a groove which fits over the top edge of the guide and is fastened to it with rivets. The top part of the holder, which is bent backward for maximum visibility, has an opening in back for insertion and removal of tabs. Since the holder has no frame, the entire tab is visible. The holders are extruded by Superior Plastics Div., Commonwealth Plastics, Inc., 426 N. Oakley Blvd., Chicago. The file guides are made by Sell Corp., 531 S. Jefferson St., Chicago

Below—Upholstery tacks specially designed for use with vinyl upholstery materials have heads molded of vinyl instead of metal heads. The vinyl-headed tacks do not tear the material as metal tacks sometimes do, and cannot corrode. In addition, the colors open new decorative possibilities. Tacks are molded of polyblend vinyl by Gora Lee Corp., 384 Seymour St., Stratford, Conn.

Below—Rok-ett knife sharpener has a case molded of cellulose acetate. Carbide jewel sharpening elements are assembled to the case after molding. The sharpener is mounted on the wall and knives can be sharpened with a few strokes. Case is molded by F. J. Kirk Molding Co., Clinton, Mass., for New England Carbide Tool Co., Inc., 60 Brookline St., Cambridge, Mass.

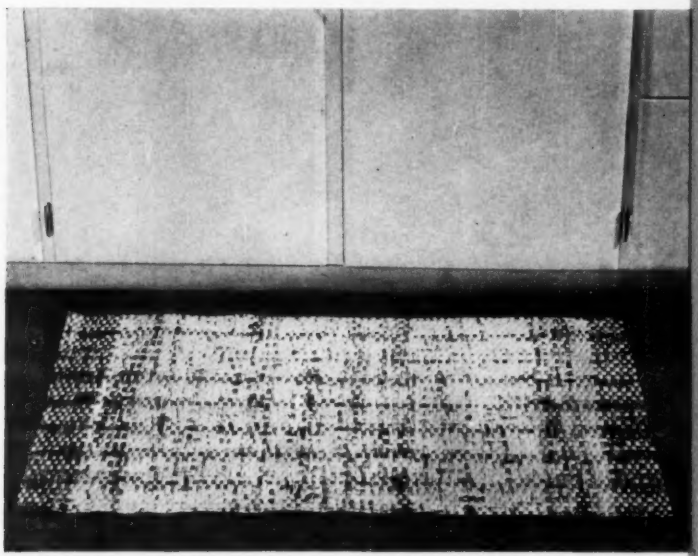


PLASTICS

Below—The Tube Roll-Up, molded of styrene, is a simple lever which slips over the bottom of a collapsible tube so that the contents can easily be ejected by rolling up the tube neatly instead of squeezing it. After the tube has been emptied, the Roll-Up can be withdrawn and used again. The Tube Roll-Up is molded in various bright colors by Peerless Molded Plastics, Inc., 401 Hamilton St., Toledo 2, Ohio, for Tube Roll-Up Co., 510 Manhattan Bldg., Toledo

Above—Oswald Jacoby's Canasta Pencil has a slot in the side through which scores, rules, and penalties can be seen. A flick of the dial atop the pencil brings the desired reading matter into view. The pencil is made of Nixon cellulose nitrate by Monroe Mfg. Co., 69 Murray St., New York 7, N. Y.

PRODUCTS



Left — Washable, color-fast mat for use in the bathroom or kitchen is made of vinyl film. Left-over ends from fabricating operations are cut into strips which are folded into narrower, stronger strips which are then woven into mats and heat sealed around the edges. The mats get their vari-colored effect because film of different colors, including plaids and other printed patterns, is used. Manufactured by Susquehanna Plastics, Inc., 404 Fourth Ave., New York, N. Y.

SPECIFY

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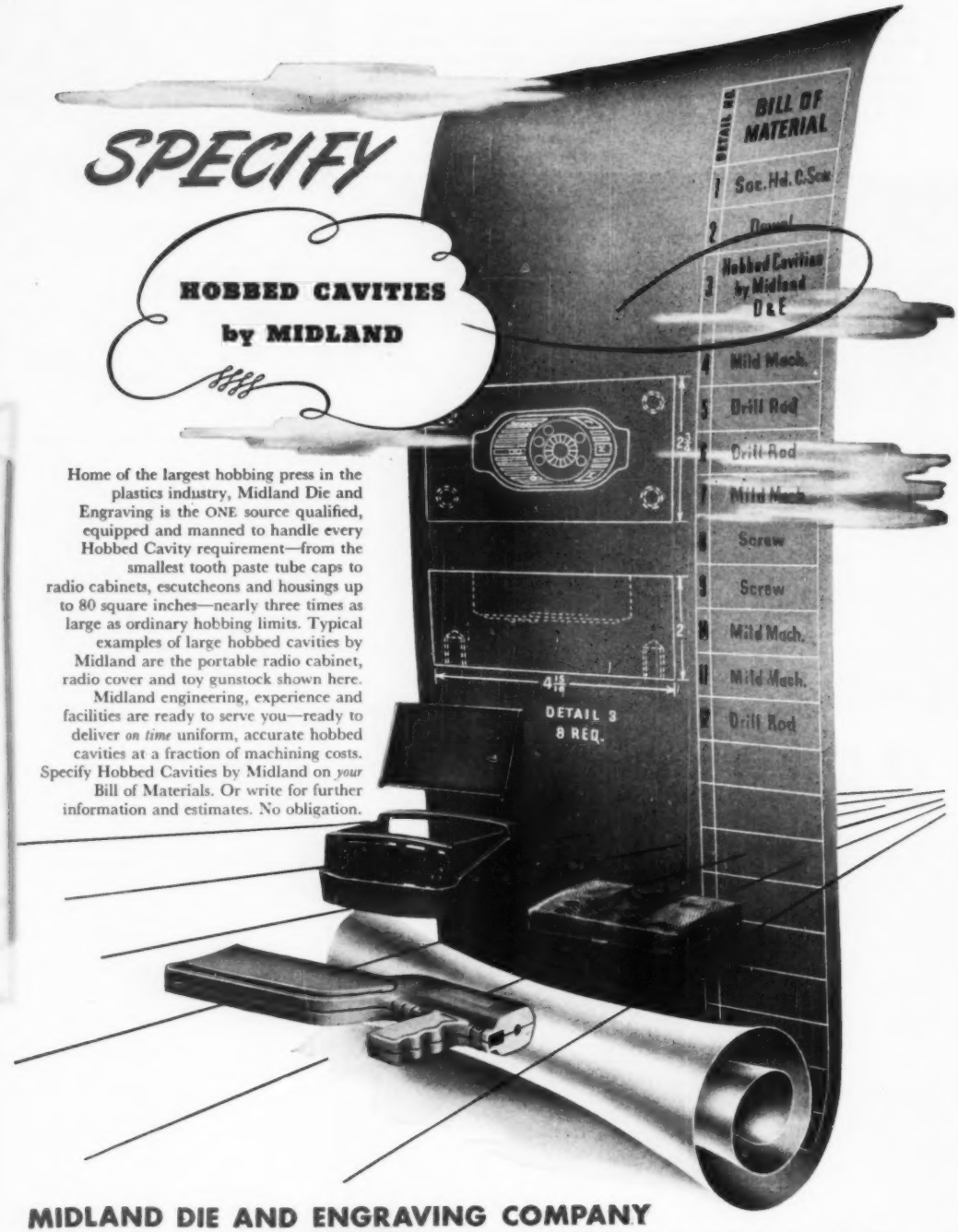
Home of the largest hobbing press in the plastics industry, Midland Die and Engraving is the ONE source qualified, equipped and manned to handle every Hobbed Cavity requirement—from the smallest tooth paste tube caps to radio cabinets, escutcheons and housings up to 80 square inches—nearly three times as large as ordinary hobbing limits. Typical examples of large hobbed cavities by Midland are the portable radio cabinet, radio cover and toy gunstock shown here. Midland engineering, experience and facilities are ready to serve you—ready to deliver *on time* uniform, accurate hobbed cavities at a fraction of machining costs. Specify Hobbed Cavities by Midland on *your* Bill of Materials. Or write for further information and estimates. No obligation.



MIDLAND DIE AND ENGRAVING COMPANY

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Makers of Plastic Molds • Die Cast Molds • Engraved Dies • Steel Stamps • Hobbings • Pantograph Engraving

Accumulator-Operated Injection Machine

ONE large and successful custom molder who has been a compression molder for 30 years—and in the injection field practically since that method was first used in the United States—has permitted MODERN PLASTICS to disclose for the first time the details of its special methods and machines used for injection molding.

About 17 years ago, when this organization, Mack Molding Co., had but one plant located in Wayne, N. J., its board of directors decided to buy one of the small early-model Isoma injection machines. It was never even uncrated because the molder's chief engineer had decided he could build a better machine for less money. (The Isoma machine was later resold to another molder.)

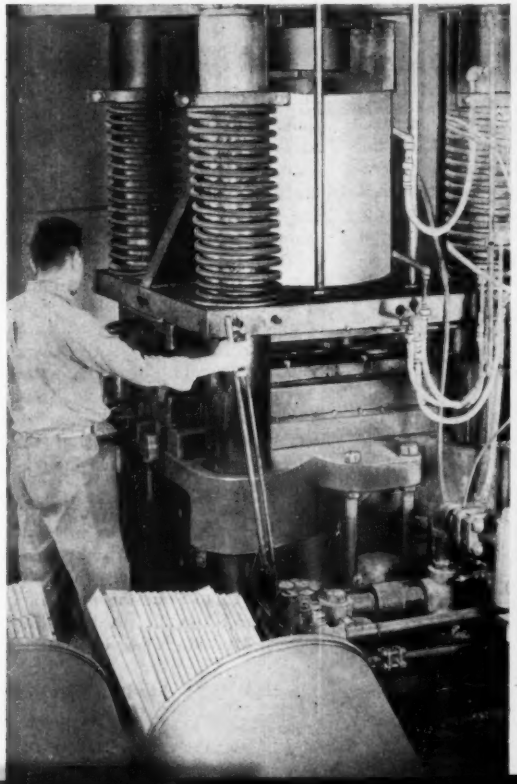
The project of building a better machine was not as simple as it first appeared. In fact, more than a year elapsed before even the smallest thermoplastic parts were accurately and satisfactorily produced—and then the first machine built by Mack was discarded and replaced by a stronger one. Even after 17 years, refinements are still being incorporated in the company's special injection machines to increase capacity as well as over-all efficiency. Today Mack has three plants —at Wayne; Arlington, Vt.; and Waterloo, Quebec, Canada. The two U. S. plants have upwards of 40 of these injection machines, the larger ones having a proved top capacity of 200 ounces.

*Reg. U. S. Pat. Office.

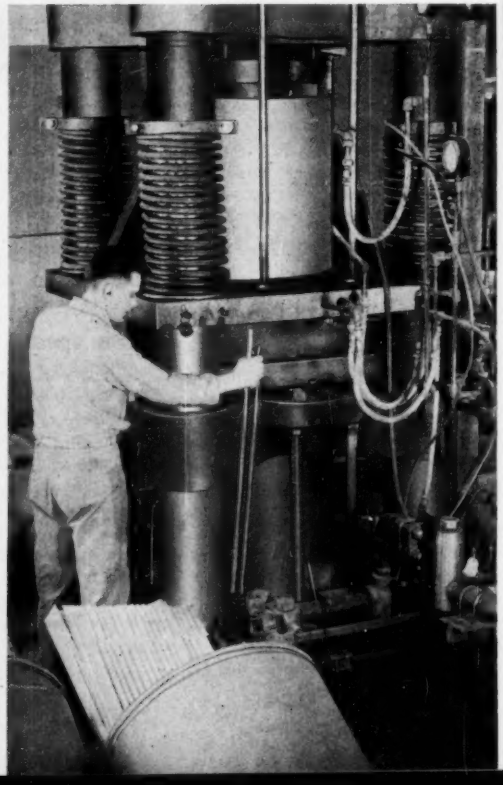
Transfer-Type Presses

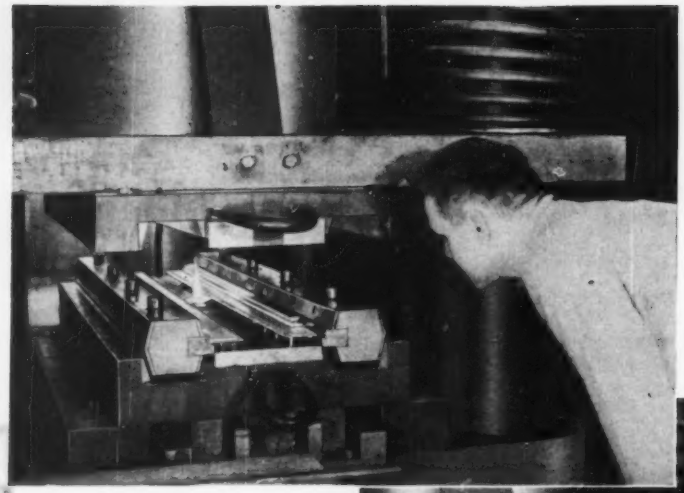
Basically, the machines designed and used by Mack are vertical, upward-acting, transfer-type presses, with special castings for the heads

With mold open, piston is out of the chamber. As operator pushes lever to first position, mold closes on low pressure

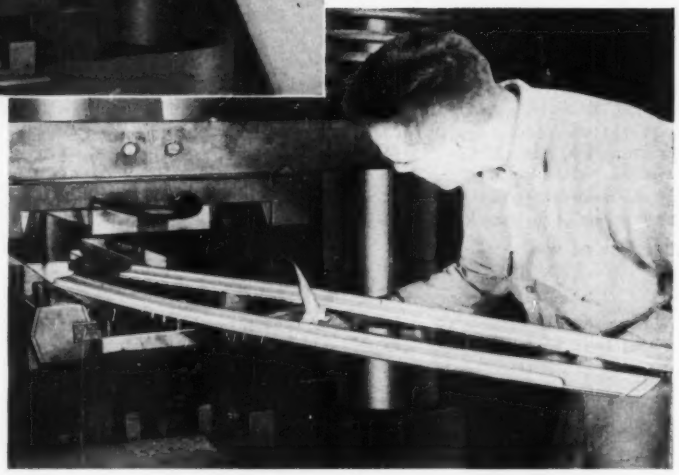


Mold and chamber continue upward; piston presses on material; 5000 p.s.i. is applied to main ram; injection is completed





After injection cycle is completed, mold is opened. Movable side cores for molding undercut slots in 54-in. long strips are raised so that strips can be removed from the mold



Operator has just removed a complete shot from this two-cavity mold. These strips are molded from a special shock-resistant styrene

and pressure pots. A movable heated bolster plate is located between the movable press bed and head. The four corners of this plate are assembled to four bushings which are a sliding fit on the strain rods. The plate carries the upper half of the mold on its under side and the injection cylinder on the top. The lower half of the mold is mounted on the press bed. Connecting the injection chamber and top half of the mold is a special sprue nozzle through which the molding material is injected.

Each strain rod is equipped with a stop on which the bolster plate rests when the mold is in the open position. Heavy spiral pushback springs are assembled on each strain rod between the top of the bolster plate and the under side of the head of the press.

The set-up of the various components of the machine is as follows: When the main ram is in its fully lowered position, the two halves of the mold are parted, since the lower half of the mold is actuated by the main ram and also because the travel of the bolster plate carrying the upper half of the mold is controlled by the location of the stops on the strain rods. In other words, the pushback springs have forced the bolster plate to follow the downward travel of the main ram until the stops were encountered; the main ram then continued to descend, thus parting the mold halves.

The injection piston is permanently fixed on the under side of the head of the press; hence it comes out of the injection chamber as said chamber is forced down by the pushback springs. Molding material is loaded into the injection chamber when the machine is in this open position.

Molding Operation

The injection molding operation with this type of equipment is accomplished as follows: With the injection chamber loaded with material, practically all of which is plasticized, hydraulic pressure is admitted to the main ram. As the ram moves upwards, the two halves of the mold meet and close. As the ram continues upward, it raises the assembly composed of the press bed and the lower half of the mold, the upper half of the mold, the bolster plate, and the injection chamber. As these components continue upward, the fixed injection ram enters the injection chamber or cylinder. The entrance of the ram into the chamber creates pressure on the molding material; as the upward movement continues, plasticized material is forced out of the bottom of the injection chamber through the sprue hole, along the runners, through the gates, and into the cavities of the clamped mold. Thus, one hydraulically operated ram accomplishes both clamping of the mold as well as injection of the material involved.

All of these presses are equipped with hydraulic pushbacks in addition to the spring pushbacks mentioned above. These hydraulic pushbacks serve to force the main ram downward when the mold is being opened. Thus there are two sets of

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When the president of Detroit's Mallory Electric Corporation brands it "The Best Coil I Ever Made"... you know this automotive coil is something *very special.* And helping to make it such is Plaskon Alkyd, the thermosetting molding compound with electrical properties never before attained in any plastic. Plaskon Alkyd was chosen because it was the plastic material which passed all the tests for dielectric strength, resistance to electrical leakage, arc resistance and dimensional stability under high temperatures.

In addition, *quick-curing* Alkyd can increase your production and reduce costs. It can be molded rapidly on automatic machines utilizing simple dies. Tooling costs are less—up to four times as many parts can be produced per mold cavity. We would welcome your inquiry for literature on how Plaskon Alkyd helps make it better, faster, and at less cost.

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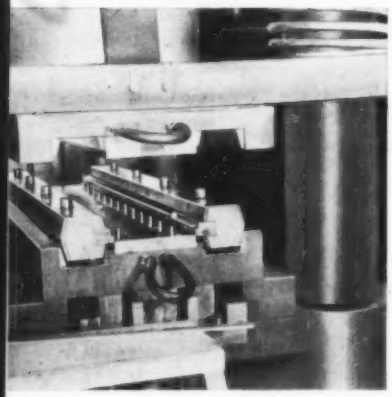
PLASKON
ALKYDS

pushbacks; spring to force the bolster plate downward to the stops, and hydraulic to force the main bed of the press down and open the mold.

When the first machine of this type was built 17 years ago, it was decided that it would be economical to operate the equipment from a central hydraulic power system. Mack's plant at that time had available the standard pressures used for compression molding—namely, about 600 p.s.i. for low pressure closing operations, and about 2200 p.s.i. for the high pressure. Mack's specifications of the first press for injection molding were therefore designed around these two pressures. A great deal of time elapsed in futile attempts to produce good parts with these pressures. But because the main and only ram of this type of press accomplishes both clamping and injection, it was necessary to sacrifice either clamping pressure or injection pressure.

To illustrate the problem, consider a press equipped with a 10-in. ram and operating on 2000 p.s.i. hydraulic pressure. This ram would exert a total pressure of about 75 tons. With the mold closed and injection about to begin, these 75 tons would be exerted against the injection ram. Consider for the moment that this injection piston was the same diameter as the main ram of the press. That would mean that 75 tons would be exerted on the material in the pot. After the injection of the material had been completed, this same pressure (assuming that the material was all fluid) would be exerted on the material in the mold.

Close-up shows 13 knock-out pins, intricate side cores for undercuts



Comparative Areas

Now assume that the projected mold area of this mold was the same as the area of the injection piston; that is, that the areas of the clamping ram, the injection ram, and the mold are exactly equal. Under these conditions—and again assuming that the material is completely fluid—the assembly composed of the upper half of the mold, the bolster plate, and the injection cylinder would be practically floating. Under these conditions the mold would probably open and flashing would occur. In order to overcome this condition it would be necessary to either 1) reduce the number of cavities in the mold, thereby cutting down the projected molding area, or 2) increase the diameter of the injection chamber thereby increasing the clamping pressure on the mold. If this latter course were followed, however, the injection pressure on the molding material would be reduced. With any reasonable size mold the machine designer was faced with the necessity of increasing the diameter of the injection chamber beyond the point where sufficient pressure could be obtained to properly injection mold most thermoplastic materials.

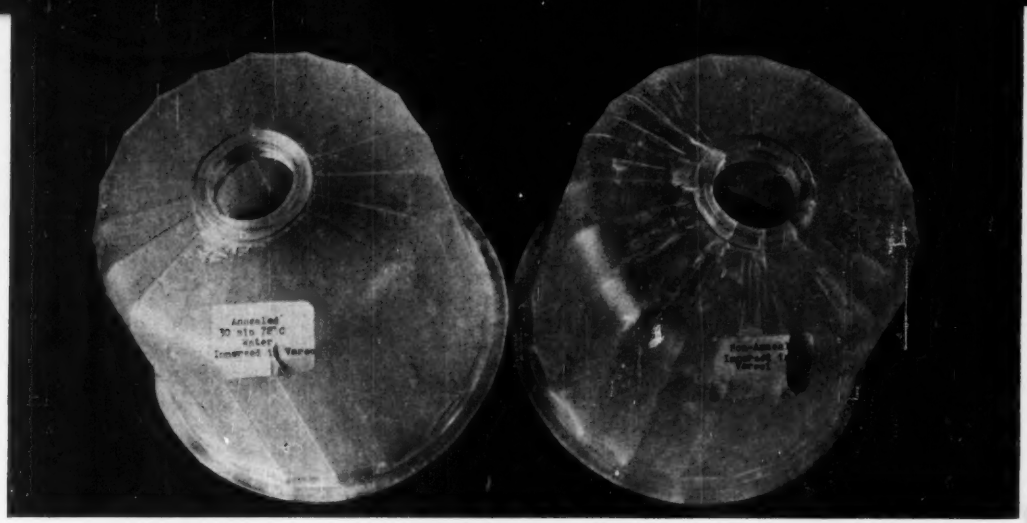
[Editor's Note: While it is true that the full pressure on the material in the injection chamber is not fully transferred to the material in the mold, the above example is cited merely to illustrate the clamping problem. At the time this work was being done—some 17 years ago—no data were available which would give a true indication of the changing difference in pressure between the material in the injection chamber and the material in the mold as the ram advanced. This pressure drop is not constant, and the factors having the greatest effect on it are: 1) state of fluidity of the molding material; and 2) the amount of material in the injection chamber.]

After much experimental work with this type of machine, a practical rule-of-thumb was worked out to the effect that flashing would occur if the projected molding area was equal to, or greater than, the area of the injection chamber. It therefore followed that pressures higher than 2500 p.s.i. were required for satisfactory operation of this machine.

The next step in the evolution of this transfer-type machine was the purchase from Dunning & Boschert Press Co., Inc., Syracuse, N. Y., of a special press designed for operation on 5000-p.s.i. line pressure. A special weight accumulator was converted to handle 5000 p.s.i. by loading the weight container with iron ore instead of the scrap iron which had formerly produced a maximum of about 3000 p.s.i. A new 5000-p.s.i. pumping system as well as a complete new set of piping capable of withstanding this very high pressure was installed.

When the new press was finally put in operation, it was found that the new machine, operated at the higher line pressure, would satisfactorily produce thermoplastic injection molded parts on a production basis. As time passed, many changes were made in the injection cylinder and the torpedo or spreader. Some injection cylinders were cored for high pressure steam for heating; others were designed to make use of electrical heater bands. All of these developments tended to increase the capacity and plasticizing efficiency of the injection cylinders. Although many of these presses have been converted to automatic operation, some are still hand operated; even with the latter, as many as 1800 complete shots have been pulled in a 7½-hr. operating period.

A wide diversity of intricate and complicated thermoplastic parts has been produced on these machines over the past years. One large piece, the 54-in. long refrigerator cabinet breaker strip shown being molded in a two-cavity mold, gives evidence of the ample clamping capacity of this type of equipment. Heavy pieces, including 8- and 10-lb. transparent styrene storage battery housings, have been satisfactorily run on a production basis. Although this equipment may not be streamlined in appearance, its performance indicates that it certainly is streamlined from the standpoint of overall operational production efficiency.



COURTESY MONSANTO CHEMICAL CO., PLASTICS DIV.

1—Annealed (left) and unannealed (right) dehydrator lids after testing. Both specimens were immersed in Varsol. Unannealed samples cracked badly; annealed units were unaffected. Annealing was done in water for 30 min. at 72°C.

Annealing Injection-Molded Styrene

by R. I. DUNLAP, F. J. POKIGO, and S. E. GLICK*

THE tremendous increase in consumption of styrene by the plastics molding industry during recent years has been largely due to the versatility of this synthetic resin. Its attractive appearance and low cost have stimulated countless attempts to extend its use into applications formerly served by metal, wood, glass ceramics, and other plastics.

While the success of so many of these ventures is a tribute to remarkable advances in the technology of styrene manufacture and fabrication, it is not surprising that some troubles have been encountered. In many such cases a little extra durability would make the difference between "just getting by" and outstanding success.

A good example is to be found in the field of housewares. Such items as cups, dishes, tea strainers, funnels, and tumblers are exposed periodically to the thermal shock of washing in hot water. Containers like coffee cups and soup bowls are required to hold a very hot liquid while the outside is exposed to room temperature. Under such conditions stresses are created which often lead to failure of the plastic through cracking and crazing. Of course, many houseware articles have been quite successful, but in a large number of cases there is considerable room for improvement on present performance.

There are several factors which influence the durability of injection-molded styrene. Mold design, con-

(*Continued on p. 86*)

*Monsanto Chemical Co., Plastics Div., Springfield, Mass.

Table I.—Results of Kerosene Test

Material	*Article*	*Unannealed*	*Annealed*	*Annealing conditions*		
				Time	*Temp.*	*Medium*
				min.	*°F.*	
Lustrex L	Dehydrator lid	Cracking	No cracking	30	162	Water
Lustrex L	" "	"	"	60	"	Air
Lustrex LX	Coffe mug	"	"	30	189	Air
Lustrex LX	Coffee cup A	"	"	50	203	"
Lustrex LX	Feeding dish	"	"	10	185	"
Lustrex LX	Feeding dish	"	"	5	190	Water
Cerex 250	Feeding dish	"	"	420	217	Air
Lustrex LX	Tea cup	No cracking				
Lustrex LX	Coffee cup B	"				
Lustrex L	Wall tile	"				
Lustrex L	Dessert dish	"				
Lustrex L	Clock faceplate	"				

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STRENGTH AND LIGHT...Commercial signs made with LAMINAC Resins are so translucent that *one* electric bulb illuminates them brilliantly. Because of LAMINAC's superior strength, the seller fully guarantees them against breakage under normal use.

LIGHTNESS AND STRENGTH...Five times lighter than one made of iron, and 35,000 times as large as a baseball, the new Westinghouse photometer meets all requirements for strength, ease of handling and maintaining, ease and economy of production.

STAMINA AND LIGHTING...Street lamp reflectors shed light on the toughness and durability of LAMINAC Resins. They offer all kinds of resistance to all kinds of weather, corrosion, and small-boy mischief.

AMERICAN *Cyanamid* COMPANY
PLASTICS DEPARTMENT
32 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Cyanamid looks at

PLASTICS TODAY

...Meet your molder

TODAY's molder of thermosets (heat-hardening resins) is of basic importance to Industry's scheme of things. He also plays a significant role in the lives of Mr. and Mrs. Consumer and all the little Consumers ...though they may not realize it.

So let's take a closer look at the companies that, together, in 1949, molded more than 112,000,000 lbs of thermosetting resins into an astounding range of industrial and consumer products; improved function and appearance; increased durability; reduced costs of production and maintenance.

Compression molders began their service in the earliest days of the plastics industry. They were, in fact, *the* pioneers in plastics—and they have been pioneering in one way or another ever since.

In helping to effect product improvement at low cost with exactly the right plastics, they have gained a tremendous amount of experience in a wide variety of industries. And they have performed so many "miracles" of design and production that today they consider extraordinary accomplishments as part of the job.

How do they do these things—how do they operate?

The modern molder's operation is all-inclusive...diversified molding facilities and equipment; trained staffs of engineers, designers, die makers, finishers, inspectors; research and testing laboratories with all modern equipment; expert merchandising staffs.

He retains scores of employees and supervisors, many with long years of experience, and carefully developed know-how. In addition he has at his command the skill, personnel, and research facilities of all large chemical companies producing plastics raw materials.

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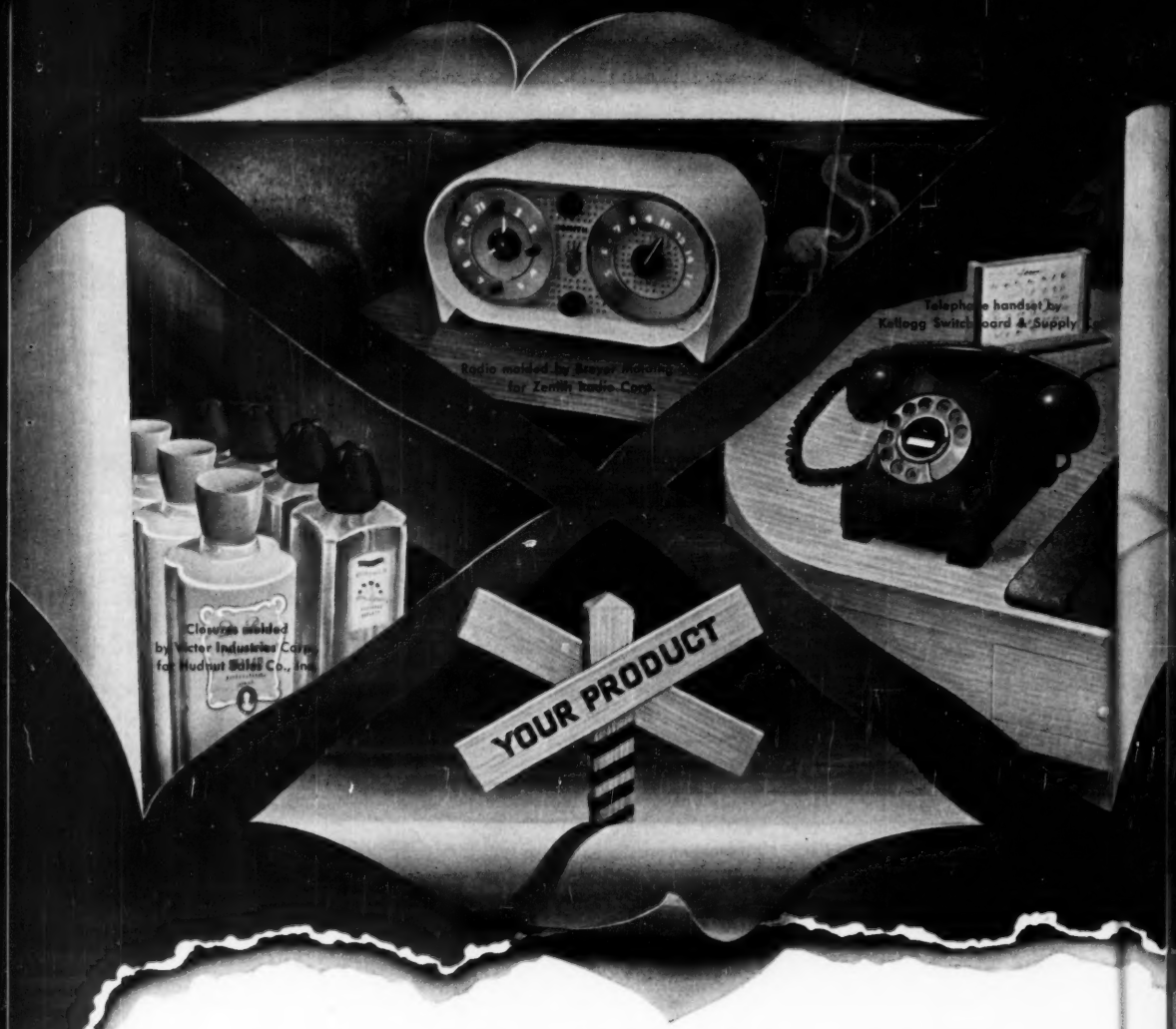

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trol of molding conditions, and use of high-quality molding compound are important. But when these factors are not sufficient to produce an entirely satisfactory item, annealing of the finished piece should be considered. Through the use of a simple, inexpensive annealing operation, the molder is provided with an excellent means of improving the performance of styrene molded pieces.

In this paper we shall describe a simple annealing technique and several commercial molding jobs to which it was successfully applied at little or no increase in manufacturing cost. We hope the laboratory information presented here will encourage other molders to try annealing in applications where durability is a factor. By means of simple tests, any molder can check for himself the benefits which can result from annealing in his own styrene applications.

Detecting Strains

When studying the behavior of styrene upon exposure to thermal and mechanical shock, it is natural to refer to glass as a somewhat similar substance. Both have amorphous structures and behave like super-cooled liquids. In the case of glass, it has been established that low resistance to heat and mechanical stress is often due to the presence of strains resulting from rapid cooling after casting or fabrication. Such strains cause the effect of "birefringence" which can be detected by means of polarized light, under which the strain patterns can be made visible under scrutiny by an observer.

When a piece of strained glass is heated until soft, the strain pattern disappears because of the natural tendency of the softened glass to attain a state of equilibrium or uniformity. This non-strained condition can be preserved to a great extent if the softened glass is allowed to cool slowly. Glass treated in this way is said to be annealed and is found to be much more resistant to thermal and mechanical stresses than in its original state of strain.

Application of the annealing principle to plastics is not new. Fabricators of acrylic sheet stock employ annealing methods to prevent crazing. Injection-molders of brush backs and other thick-section objects obtain slow cooling by placing the articles in warm water as soon as they are removed from the mold. The Bell Telephone Laboratories, J. H. DuBois, and James Bailey have all reported annealing treatments for styrene. Bailey[1], in particular, has devoted considerable study to the annealing of extruded rods, molded slabs, and machined parts and has developed time-temperature annealing cycles for specimens of various thicknesses. In contrast to the case of glass, observation of birefringence by means of polarized light was of little value as a means of following the results of styrene annealing, so Bailey developed a kerosene immersion test which was rapid, easy, and apparently reliable for the detection of internal strain.

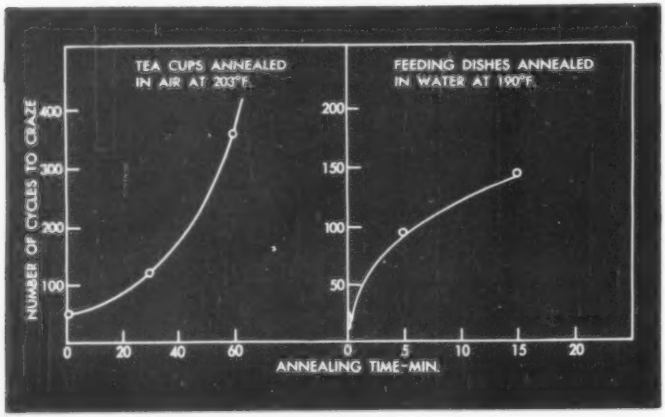
Such annealing methods for styrene have been used chiefly for machined parts and were fairly commonly employed on a number of important items produced during the war. Annealing has not become popular with injection molders of large volume items, however, chiefly because it has not been recognized that its advantages can often justify the cost of an extra operation and of the equipment involved.

Our approach to the problem of annealing injection-molded styrene was somewhat different than that employed by Bailey for the treatment of machined objects. It was felt that annealing at one temperature might be as good for many applications as using a more difficult time-temperature cycle. While the ultimate in properties might not be attainable by the former method, marked improvement would be expected, and the relative simplicity and ease of operation would make this method more appealing costwise.

Table II.—Results of Thermal Shock Test

Material	*Article*	*Cycles before failure*		*Annealing conditions*		
		Unannealed	*Annealed*	*Time*	*Temp.*	*Medium*
					°F.	
Lustrex LX	Coffee cup	100	300	1 hr.	198	Air
Lustrex LX	Tea cup	50	360	1 hr.	203	Air
Lustrex LX	Coffee mug	80	300	2 hr.	198	Air
Lustrex LX	Feeding dish	10-25	145	10 min.	190	Water
Lustrex LX	Feeding dish	10-25	145	3 hr.	185	Air
Cerex 250	Feeding dish	100	480	7 hr.	217	Air

2—Comparison of annealing efficiency employing two techniques: air and water

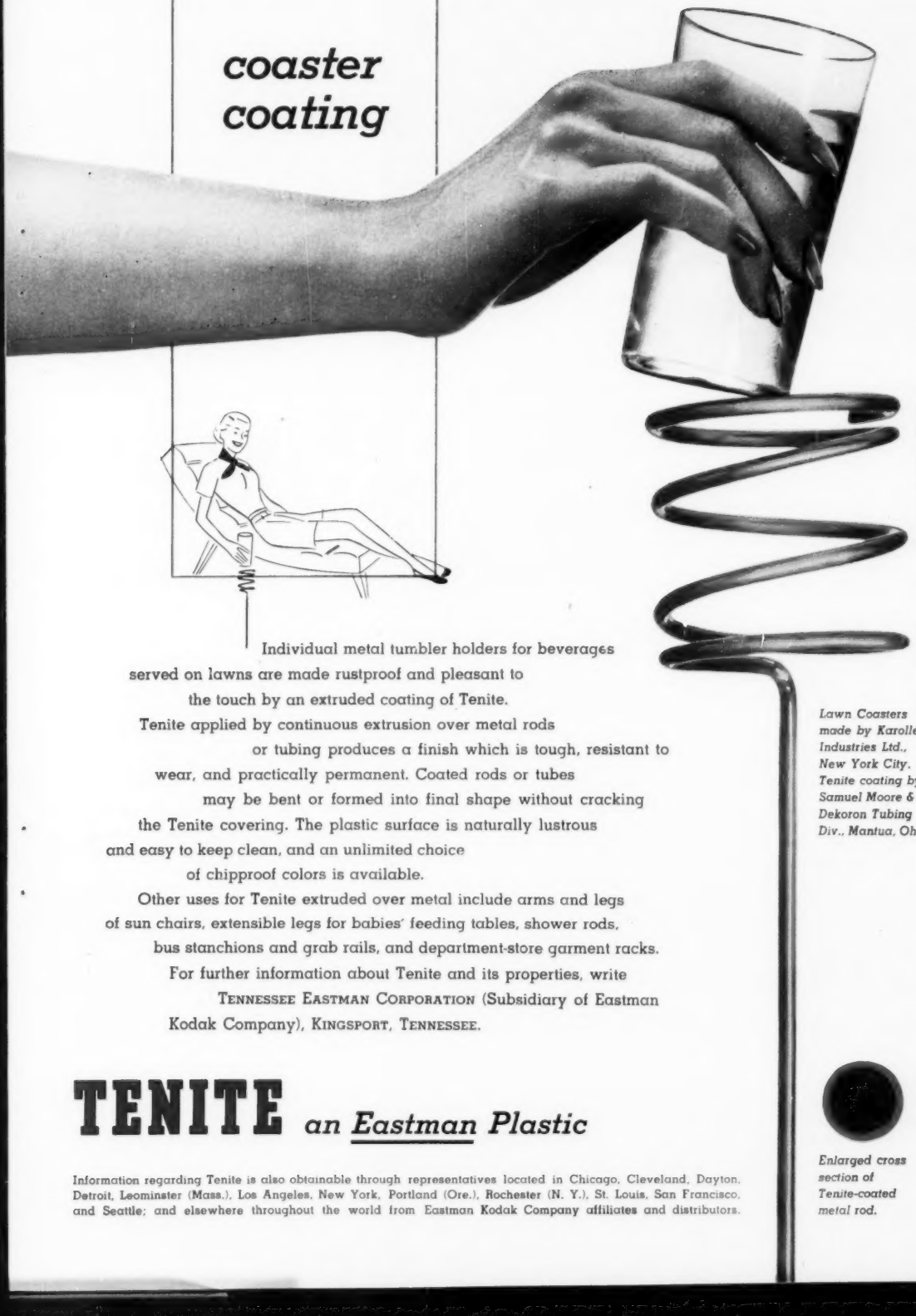


Annealing Technique

Both circulating air ovens and water baths were found suitable for annealing styrene. Thermostatic control of temperature to ± 2° F.

[1] "Annealing of Styrene and Related Resins," James Bailey, Modern Plastics, *24*, 127 (Oct. 1946).

coaster coating



Individual metal tumbler holders for beverages served on lawns are made rustproof and pleasant to the touch by an extruded coating of Tenite.

Tenite applied by continuous extrusion over metal rods or tubing produces a finish which is tough, resistant to wear, and practically permanent. Coated rods or tubes may be bent or formed into final shape without cracking the Tenite covering. The plastic surface is naturally lustrous and easy to keep clean, and an unlimited choice of chipproof colors is available.

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For further information about Tenite and its properties, write Tennessee Eastman Corporation (Subsidiary of Eastman Kodak Company), Kingsport, Tennessee.

Lawn Coasters made by Karolle Industries Ltd., New York City. Tenite coating by Samuel Moore & Co., Dekoron Tubing Div., Mantua, Ohio.

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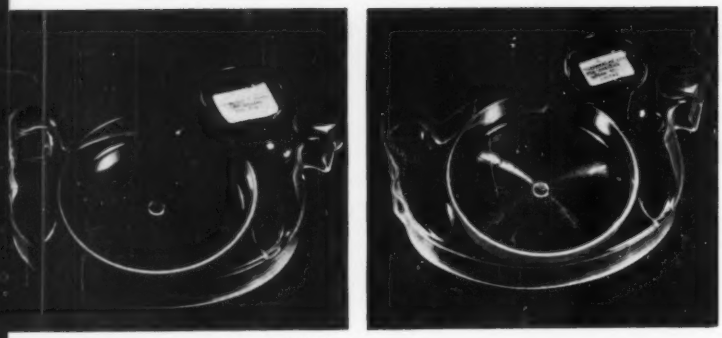
Information regarding Tenite is also obtainable through representatives located in Chicago, Cleveland, Dayton, Detroit, Leominster (Mass.), Los Angeles, New York, Portland (Ore.), Rochester (N. Y.), St. Louis, San Francisco, and Seattle; and elsewhere throughout the world from Eastman Kodak Company affiliates and distributors.

Enlarged cross section of Tenite-coated metal rod.



COURTESY MONSANTO CHEMICAL CO., PLASTICS DIV.

3—Annealed (left) and unannealed (right) feeding dishes after undergoing thermal shock testing. Annealed unit showed only traces of crazing after 145 cycles; unannealed cracked after 55 cycles

was maintained in both types of apparatus.

During the earlier stages of the investigation, annealing conditions were chosen rather arbitrarily and adjusted as dictated by testing results. Later, a systematic search for optimum conditions was established and employed whenever the supply of molded articles was sufficient. This scheme had as its first objective the determination of the highest allowable annealing temperature for a reasonable exposure period. One molding was annealed at the heat distortion temperature of the plastic; the temperature was then raised or lowered until a molding would show slight distortion after 30 min. of annealing. The annealing temperature selected for testing work was usually 4° F. below this figure.

Moldings were annealed for various periods of time at the temperature thus selected, were allowed to cool in air to room temperature, and were then ready for testing. An optimum annealing time could be determined by the results of accelerated tests such as described below, and would be the shortest time which produced moldings with satisfactory properties.

There appears to be nothing magical in any particular set of annealing conditions. Substantially the same results can be achieved at a lower temperature for a longer time as at a higher temperature for a somewhat shorter time. Thus, the commercial molder who wishes to investigate the potentialities of annealing should have little trouble in obtaining desired and satisfactory results.

Testing Methods

Some sort of test was required to compare the durability of molded items conditioned in different ways. Obviously, actual use tests are too time-consuming for preliminary work, so accelerated tests were employed. A kerosene test and a thermal cycling test are described below. The former is rapid and gives a qualitative picture of durability; the latter is more laborious but has the advantage of being semi-quantitative and of simulating conditions of use more closely.

1) The Kerosene Test: The styrene article was immersed in Varsol No. 2 (Socony-Vacuum) for 1 min. and then examined for cracking and crazing. For thick sections it was sometimes instructive to drill a series of $\frac{3}{8}$-in. holes in the piece before immersion. This is essentially the test described by Bailey, modified only by standardizing on a specified grade of mineral spirits.

In some moldings, cracking always took place near the gate; this was particularly true for center-gated pieces. In such cases, testing by application of two or three drops of Varsol to the gate proved to be as satisfactory as complete immersion of the piece.

2) The Thermal Shock Test: This is an accelerated use test for cups, tumblers, dishes, etc. and was designed to indicate the performance of containers for hot and cold foods. It consists of filling the article with hot water and replacing it after 1 min. with cold water. After another interval of 1 min. the cycle is repeated.

Cold water temperature was 40 to 45° F. for our tests. When testing items molded from heat-resistant styrene, the hot water was maintained close to the boiling point. With articles made of general-purpose material, somewhat lower temperatures are recommended in order that warpage should not obscure the crazing and cracking.

Articles were usually examined for cracking and crazing after every 10 cycles. An article was classified as having failed when careful examination revealed any crazing or cracking at all. These first signs of failure were usually not apparent upon casual examination and in actual use the piece would generally be considered serviceable far beyond the arbitrary point of failure as defined above. Continued hot and cold cycling beyond this failure point led to larger areas of crazing and sometimes to deep cracking of the piece.

Immersion of the entire article alternately in hot and cold water does not give the same results as the above test.

Results

1) Kerosene Testing: Several molding applications were brought to our attention because of cracking

Table III.—Effect of Molding Conditions on Lustrex LX Feeding Dishes

Overall molding cycle	*Die temperature*	*Kerosene test*	*Thermal cycles before failure*	*Compressive load to cause cracking*
sec.	°F.			*lb.*
30	90-110	Cracking	10-25	35
40	160-170	No cracking	25-55	
55	"	"	"	
65	"	"	"	62

trouble when the items were being handled in packaging and assembling operations. Variations of molding conditions within practical limits had not eliminated these difficulties. Specimens were then annealed and subjected to the kerosene test. Their behavior is typified by the photograph (Fig. 1, page 83) of dehydrator lids. The unannealed samples cracked badly upon immersion in kerosene, while annealed ones were unaffected. This is a good example of a highly strained molding which could be relieved by annealing and made much more resistant to mechanical shock and stress.

Table I, page 83, summarizes the results obtained upon application of the kerosene test to a variety of injection-molded articles. All the items which failed the kerosene test were made satisfactory by a simple annealing treatment. Of course, there are many moldings which are resistant to kerosene in the "as molded" condition; some of these are included in Table I. It is worthy of note that these were thin-section pieces which, in general, seem more resistant to kerosene than do thicker ones.

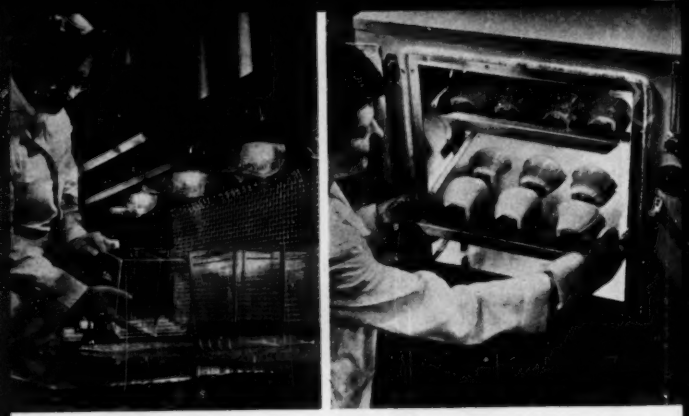
2) Thermal Shock Testing: The kerosene test, while useful, is not believed to be entirely indicative of the performance of styrene articles expected to withstand the thermal shock of hot foods and dish-washing. Therefore, in testing housewares, the more quantitative hot-cold water cycling test was employed to study the effect of annealing.

The number of thermal cycles before failure is plotted against annealing time in Fig. 2, page 86, for Lustrex LX tea-cups and feeding dishes. Durability of the feeding dishes appears to be approaching a maximum. Most probably the tea-cups would show the same effect if tested more thoroughly; the up-sweep in the curve as drawn probably represents experimental variation. With both these items, thermal shock resistance was improved as much as seven-fold following the annealing process.

Comparison of Tests

An interesting comparison between the thermal shock test and the kerosene test was obtained with

(*Continued on p.* 145)



COURTESY KOPPERS CO., INC., CHEMICAL DIV.

Left: Styrene battery cells are after-annealed by infra-red radiation. At right, water vessels are being treated by electric forced-air circulation oven

More Details on Annealing

ACCORDING to technicians in the development laboratory at the Kobuta Plant of the Chemical Div., Koppers Company, Inc., major stresses in molded styrene parts can be alleviated by: 1) Controlling the design of the product and the design of the mold to eliminate the physical cause of the stresses; 2) Proper regulation of molding conditions; 3) Annealing of the part in the molding machine before removal; 4) After-annealing of the finished part in a suitable heating medium.

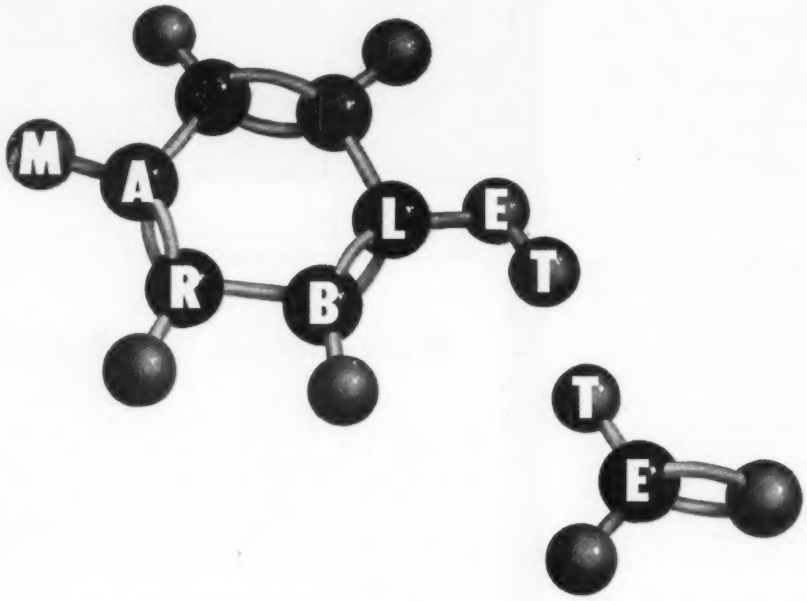
According to these technicians, after-annealing has proved to be the most economical method of relieving stresses and, furthermore, is the most versatile in that it also may be applied to molded objects in which stresses have been set up by machining and fabricating. After-annealing may be accomplished by: 1) heating the molded part in a circulating air oven, 2) immersing it in a hot water bath, or 3) subjecting it to uniform infra-red radiation.

Koppers technicians have determined that the annealing of many styrene articles may be accomplished by any of the three mediums at temperatures of 150° to 175° F. for periods of from 1 to 3 hours. The hot water bath can be arranged more quickly and with the least financial outlay. The circulating air oven and infra-red radiation methods of annealing are also easily managed and provide easy control of the process after definite temperatures and exposures have been determined for individual plastic products.

Correct annealing time and temperature must be determined experimentally to suit each individual product. A simple test involving the immersion of the specimen in a petroleum solvent will indicate not only the need for annealing but also the effect of different periods of exposure and degrees of temperature in relieving the stresses in the molded part.

Petroleum solvents for stress testing may be obtained from several oil companies upon request. Although kerosene may be used, it has not proved as effective as some commercial petroleum solvents.

For indication of stress, the annealed or unannealed parts are immersed in the solvent for 1 min. and then are removed and allowed to drain thoroughly and air dry. Strains will be noticeable immediately or within a 5-min. period. Because solvent testing renders the object unfit for sale or further use, this testing procedure can only be used as a production control on spot samples to determine the need for or the effectiveness of annealing.



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Plastics Meet the Acid Test†

by RAYMOND B. SEYMOUR††

IN spite of an annual cost that rivals the interest on the national debt (174)[1], industrial corrosion is often accepted as an operating expense rather than as a disease which is being conquered by modern corrosion engineering. There is no universal cure for the ravages of corrosion, but skilled corrosion engineers usually find a solution to each specific problem. Some of the general methods that have been considered for corrosion abatement (164) are cathodic protection, alloys, inhibitors, metal coatings, slushing oils, protective coatings, linings, and cements.

While this article is devoted entirely to the use of plastics as materials of chemical construction, it should be emphasized that this constitutes only one of the tools available for combatting corrosion. In addition to a knowledge of all available methods, the ultimate solution to each corrosion problem requires a consideration of the laws of economics and good judgment based on common sense. Too often, recommendations for the solution of corrosion problems are limited to materials available from one commercial source. Competent corrosion engineers, of course, usually make unbiased recommendations.

As a result of joint efforts by corrosion engineers, "miracle products," based on inadequate tests and manufactured in garages, are now obsolete. Empirical approaches are being replaced by technically sound investigations conducted by competent corrosion engineers. For example, Committee 6A of the National Association of Corrosion Engineers was formed to provide performance data on generic corrosion-resistant materials irrespective of trade names. Progressive manufacturers have now identified their products generically, so that the engineer need no longer be confused by the customary maze of trade names. The advantage to be gained by the work of this committee becomes apparent when it is realized that there are more than 100 different trade names describing protective coatings based on one specific copolymer of vinyl chloride and vinyl acetate. Similarly, the American Society of Testing Materials through its Committee C-3 is developing authoritative tests for corrosion-resistant cements. As the fruits of the works of these committees become available, other useful information may be published.

Infant industries lacking access to technical knowledge often masquerade under the cloak of trade names and erroneous claims, but as these industries mature, the responsibility to the customer usually overshadows selfish interests. A clothing manufacturer unwilling to describe his products as cotton, rayon, nylon, or wool could not survive in the 20th century. It may be appropriately noted that while the selling price of men's suits varies considerably, the quality-conscious customer usually considers know-how, reputation, and the responsibility of the manufacturer as well as the selling price.

The application of plastics as materials of chemical construction has been discussed previously by Bartoe (13), Carswell (23), Fontana (63), Gallay (67), Mattiello (115), Volodin (177), Yarsley (185), and Yelton (186). Such applications may involve temporary protective materials such as slushing oils and strippable films (26), but this article is limited to more permanent protection such as that from protective coatings, linings and cement.

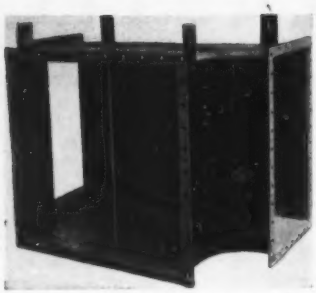
Protective Coatings

According to Uhlig (174), the annual materials cost for protective coatings exceeds $500 million. He estimated the cost of application as three times this value, but because of upward trends in labor costs and little change in the price of protective coatings, this ratio may be on the conservative side today. Hudson (87) has estimated that 120 million gal. of protective coatings are used annually.

Since most protective coatings serve merely as inert barriers between the corrosive environment and the metal to be protected, it is obvious that surface preparation is of prime importance. In order that the coating may be in intimate contact with the metal, the metallic surface must be free from rust, dirt, grease, and mill scale (113).

Most practical engineers choose sand, shot, or grit blasting when possible (86, 122, 129), but suitable surface preparation is generally impractical in maintenance and field work. Unless mill scale is removed by weathering followed by wire-brushing, sand blasting, or pickling, the application of protective coatings is not recommended (17). Mill scale may also be removed by flame

*Reg. U. S. Pat. Office.
†Presented at a meeting of the North Jersey Section of the American Chemical Society at New Brunswick, N. J., March 18, 1950.
††Technical director, Atlas Mineral Products Co.
[1]Numbers in parantheses relate to references at end of article.



COURTESY THE ATLAS MINERAL PRODUCTS CO. OF PA.

A junction duct in an exhaust system. The inside is coated with ⅛ in. sprayed compounded rubber latex, while exterior is coated with a vinyl chloride copolymer coating

priming (5, 111), followed by wire-brushing. The resulting surface is usually dry and hence superior to moist surfaces that are sometimes considered adequate. Many maintenance men who cannot use the previously mentioned methods for surface preparations have secured some degree of success using a rotating wire brush (31). In such cases, the surface should be treated with an inhibitor, otherwise the rusting process may continue even under the most inert coating.

A recent examination of a submerged bituminous-coated iron trough in a filter plant showed that over 50% of the metal had been converted to iron oxide under some 10 coats of a proprietary product used as a maintenance coating. A full working day was required for removal of the heavy rust from 50 sq. ft. of surface before a styrene copolymer-base protective coating could be applied. This coating has already proved itself superior in this specific application, although the comparison is not particularly significant due to the lack of surface preparation with the bituminous-type paint.

As a result of considerable effort directed toward the investigation of the passivation of metal surfaces, there are over a score of proprietary treatments. Some of the best known, such as Bonderizing, Parkerizing, and Granodizing, use phosphoric acid or its salts (25, 38, 64, 168) because of the superior metal bond obtained. Others such as Cromodine, use chromic acid to inhibit rust formation. Such surface treatment is advocated for aluminum, zinc, and steel, but oxalic acid treatment is preferred for copper, brass, lead, and terne plate. Some proprietary solutions contain solvents (172) and wetting agents (53) in addition to these acids.

McClenahan (116) claimed seven years continuous service at pH 3.5 for an asphalt coating over phosphoric acid-zinc chromate-treated steel. This surface treatment is somewhat similar to the widely accepted wash-primer system (155), which consists of phosphoric acid, zinc chromate, and polyvinyl butyral in butanol. This primer system has excellent adhesion to steel, aluminum, zinc, copper, and stainless steel (43). It has given good service on ship bottoms, and superior results have been obtained for this application by using a top coat of rosin, copper oxide, and a vinyl chloride copolymer (131). Wash-primer systems may be used directly over wire-brushed steel, providing a minimum of residual rust and surface impurities are present.

Adhesion is a function of surface cleanliness and is probably the next most important factor in protective coating technology. Unless the coating can wet the surface, a poor bond will result. Adhesion is also affected by active groups in the plastic coating (84) and inert fillers. Natural rubber, neoprene, and polyvinyl chloride have poor adhesion to steel, but plastics, such as chlorinated or cyclized rubber, styrene-butadiene copolymers, and polymers containing carboxyl groups, may be applied directly to steel and do not require special primer systems. Among the many products used in primer systems for non-adhesive coatings, are mixtures of butadiene-acrylonitrile copolymers and terpene-phenolic condensates (58,148), reaction products of resorcinol and formaldehyde (52), organic isocyanates (171), cyclized rubber (19).

The resistance of a selected coating to specific corrosive conditions is basic, but is secondary to workmanship and the previously mentioned factors. Providing the polymer selected is sufficiently resistant and the film continuous, its effectiveness will be a function of the thickness (104), its resistance to moisture vapor transmission (42), and water absorption. However, much confusion exists due in part to the complexity of the problem and the multiplicity of the factors involved. No coating is any better than its thinnest section, and if this be nil, as it often is when pinholes are present, the coating is bound to fail. Spray and brush application methods have been discussed by Makins (112). The latter is satisfactory if the flowing-on rather than the customary painting technique is used. In some cases, such as in the coating of concrete or other porous surfaces, it is advantageous to work in the first coat by brush even though subsequent coats are applied by the spray method.

Much has been published on methods of application and comparative resistance of various coatings (27, 29, 42, 48, 91, 98, 107, 118, 155, 158, 161, 181). These may be applied as solutions, aqueous dispersions (149), organosols (138), plastisols (21), hot melts, or by flame spraying (72, 73, 109). Regardless of the method of application, all precautions cited previously must be used for adequate performance.

Some of the confusion existing in the protective-coatings field can be dispelled if applicators will focus their attention on the entire system rather than on any one phase. The corrosion resistance of the plastic itself is generally well known, but such information constitutes only one step in determining the adequacy of a material for a specific problem. The effectiveness of a coated specimen should be proved thoroughly on a small scale before being used under plant conditions. A plastic that meets the acid test in the plant will usually meet various small-scale and laboratory tests, but the reverse is not always true.

The tests on unsupported films are straight forward (175) and the results are usually in accord with published data. Some success has been attained by the colorimetric determination of ferrous ions in the medium surrounding coated steel specimens (8, 9, 10, 11), but in spite of much investigation significant laboratory tests have not developed.

Linings

The accepted difference between a protective coating and a lining or membrane is based generally on the ultimate use. Coatings are not

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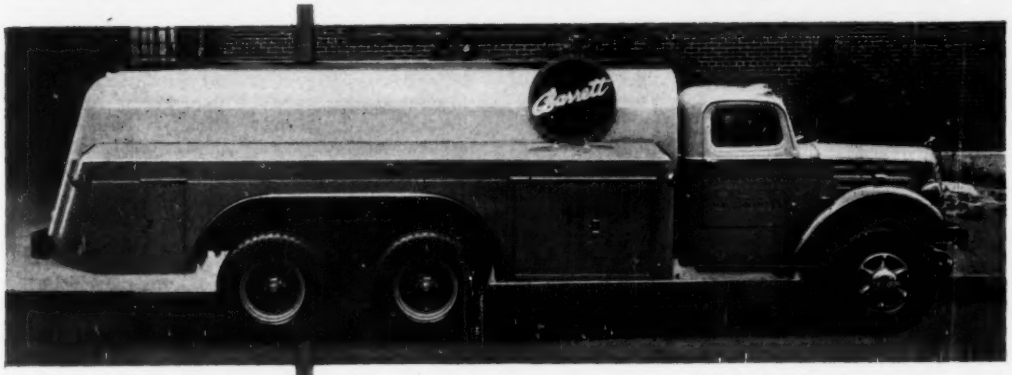

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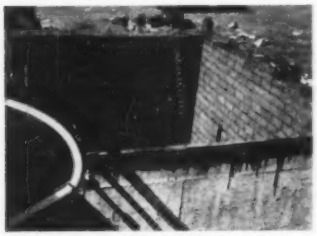
usually subjected to continuous immersion but rather to fumes, splash, or intermittent service. Linings are usually at least ⅛ in. thick (170) and may be applied as multiple-coat systems or as sheets. Much of the technology used today in this field is an adaptation of techniques developed for natural rubber linings using either solution, latex, or sheet form.

Soft and hard natural-rubber membranes constitute the bulk of industrially used linings, but improved products are being gradually, although sometimes reluctantly, accepted by industry. Rubber lacks resistance to oxidizing agents, solvents, and heat; while some of these deficiencies have been overcome by improved synthetic polymers, no universal lining is known.

Most of the precautions outlined previously for protective coatings also apply for linings. These are usually installed by experienced artisans, and hence there are less complaints and failures than with protective coatings. Most lining shops insist on a sand, or grit-blasted surface and the immediate application of a primer coat. Sheet linings are usually adhered by mechanical stitching to the primed surface, and these membranes are generally spark-tested before vulcanization is accomplished.

Properly selected membranes are subject to penetration of the corrosive material but usually undergo no surface attack like metals (20). Providing the operation is not subjected to mechanical damage, these linings last indefinitely. However, since down time required for repair is costly, a brick sheathing is added as further protection if there is danger of mechanical damage, or if the system is to be subjected to elevated temperatures (80, 176). In some cases, the brick is actually embedded in the membrane (44). This practice would probably produce an unstable structure if the operating temperature were above the softening point of the membrane for any period of time. Lead-lined and wooden tanks are still used, but in many industries they are being replaced by concrete or steel tanks lined with a plastic membrane protected by brick joined with a suitable corrosion-resistant cement (189).



COURTESY RAYEL ENGINEERING

Concrete tank lined with asphalt-plasticized membrane is protected by two courses of carbon brick: first course joined with plasticized sulfur cement; inner course with phenolic-base cement

Corrosion-Resistant Cements

Corrosion-resistant cements, which may be classified as silicate, sulfur, or resin base, are customarily used as jointing materials for corrosion-resistant brick or tile. The most common brick is a red- or buff-dense highly vitrified shale product having low acid adsorption (39,78). Less dense brick and tile (95) is generally used in the paper industry (92), but difficulties are encountered if crystallization takes place within the pores (3). Under strong alkaline conditions or in the presence of hydrofluoric acid, carbon (90) rather than shale brick is used.

Considerable general information has been published on this subject (6, 12, 34, 56, 99, 100, 121, 132, 133, 167, 178), but as in the case of coatings and linings, a universal cement does not exist. Each problem must be considered specifically and recommendations made based on service conditions, economics, and common sense. The ideal corrosive-resistant cement should have a long working time, rapid set, low adsorption, good adhesion to tile, low coefficient of expansion, long shelf-life, good workability, good chemical resistance, and low toxicity.

As mentioned above, A.S.T.M.'s Committee C-3 is currently working on the development of standard tests for acid-resistant cements. The most reliable results, as measured by correlation with actual results in industry, have been obtained using small coupons with a maximum surface and measuring the rate of change in weight when exposed to corrosives at various temperatures. Two investigators (2,15) have advocated grinding the cement and then subjecting the pulverized material to corrosive conditions. In one commonly used method (169), figure-eight briquettes are broken after exposure to the corrosive medium, and the tensile strength compared with that of the original.

Corrosion-Resistant Materials

Silicates—Aqueous solutions of sodium silicate can be hardened either by dehydration or by the action of a latent acid such as sodium silicofluoride. These products, which have excellent resistance to acids with the exception of hydrofluoric acid, are seldom used as membranes or coatings but are used widely as cements (65, 119, 120, 123). They are not suitable for constant exposure to neutral or alkaline conditions; in spite of published statements on high temperature resistance, they have not proved satisfactory at temperatures above 600° C. and are seldom used above 400° C.

Litharge-glycerol—Cements based on litharge and glycerol have been used for many years in the paper industry but are gradually being replaced by resinous cements based on polymers of furfuryl alcohol.

Sulfur—Cements based on sulfur have been used for over 200 years to join cemetery headstones and later as joints for bell and spigot water pipe (130), but their use as materials of chemical construction was not recorded until 1921 (7). In contrast to the previously mentioned silicate and litharge-glycerol cements, sulfur cements are used as hot melts rather than as mortars. The highly plasticized forms are used occasionally as membranes, but their major use is as chemical-resistant cements. Much of the sulfur cement used today consists of a graded-silica aggregate and sulfur plasticized with an olefin polysulfide (50). Carbon filler is used when resistance to hydrofluoric acid is required. General information on the chemical resistance of sulfur cements has been published (134).

Bitumens—Asphalt and coal tar are the most popular plastic materials for protection against corrosion. These products have been blended with each other and with almost every other available plastic material. Bitumens are used as lacquers, melts, trowelling compositions, emulsions, and as sheet lin-

ings, but will not be discussed in detail in this article. Asphalt and coal tar are generally resistant to non-oxidizing acids, salts, and alkalies at ordinary temperatures, but are adversely affected by solvents.

Natural rubber—Soft or hard vulcanized natural rubber is often used as a sheet lining for protection against abrasion, non-oxidizing acids, salts, and alkalies. It is unsatisfactory for temperatures above 60° C. and is attacked by most solvents. Natural rubber in latex form has also been used for sprayed-on coatings or linings over a primed surface. Some space will be devoted to its derivatives, but no attempt will be made to discuss the broad application of natural rubber.

Rubber derivatives—Chlorinated rubber (136) has been known commercially since 1915, but its use in protective coatings was delayed because of the high viscosity of the early product. Coatings based on plasticized chlorinated rubber have excellent adhesion to concrete and steel. In spite of early condemnation (102), coatings based on this product, when properly applied, have proved satisfactory for resistance to alkalies and acids including oxidizing acids, such as 10% nitric at temperatures below 100° C.

Cyclorubbers (19) are somewhat similar in characteristics to chlorinated rubber. These products have been used extensively as coatings for concrete but are giving way to styrene-butadiene copolymers (22).

Rubber hydrochloride has been investigated but has never been used to any great extent as a protective coating.

Synthetic rubber—While copolymers of butadiene with styrene or acrylonitrile are at least as resistant to acids and alkalies as natural rubber, they have not been used very much for corrosion protection. However, blends of the butadiene-acrylonitrile copolymer with terpene-phenolic resins have been used as adhesives for sheet linings and coatings, and the non-rubbery high-styrene copolymer is of interest as a coating (22).

Neoprene is used in the form of latex (37), solution, and sheet of various thicknesses and, with the exception of service with hydrochloric acid, is at least as resistant to corrosion as natural rubber. Neoprene has superior resistance to abrasion, elevated temperatures, and aliphatic solvents. High solids-containing trowelling cements and coatings based on neoprene have given excellent service as patching materials for rubber tanks and conveyor belts.

COURTESY THE ATLAS MINERAL PRODUCTS CO. OF PA.

Test floor located in a meat-packing plant. Portland cement at left was badly disintegrated, while brick joined with a furfuryl-alcohol cement has withstood the effect of the corrosive conditions resulting from fats, oils, and other materials

Polydivinylacetylene (150) is claimed to have corrosion resistance superior to neoprene.

Thiokol and similar products in latex (127), solution (151), and sheet form have been used for protection against corrosion. These products are characterized by good adhesion and resistance to acids and solvents but have poor resistance to alkali. The use of Thiokol as a plasticizer for sulfur cements was mentioned previously (50).

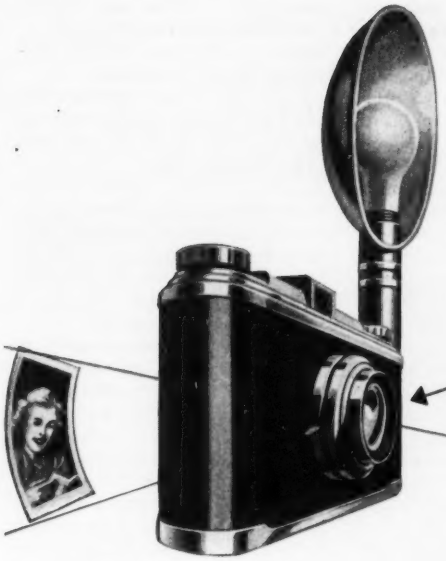
Phenolic resins—Corrosion-resistant cements based on phenolic resins have been used in considerable volume for acid service at temperatures as high as 180° C. for over 15 years (46, 94, 163), but are being replaced in part by cements based on polymers of furfuryl alcohol. Some of the shortcomings of phenolic cements are limited shelf-life and lack of resistance to alkalies, but alkali-resistant modifications are now available.

Phenolic-resin base cements are usually prepared by mixing an inert filler such as silica or carbon containing an acid-setting agent with a liquid phenolic resin. The carbon filled cements have good resistance to hydrofluoric acid and improved resistance to alkalies. These products usually have a working life of 10 to 15 min. and set hard in 36 to 48 hr. at room temperature. Structures consisting of brick and these cements may be placed in acid service within 2 or 3 days, but since several weeks are required to secure a complete set, they should not be subjected to solvent service until thoroughly cured unless previously treated with acid. There are several proprietary brands available in every industrialized country. Care must be used with some of these materials due to their adverse physiological effect on the applicator (154).

In a recent innovation, these resins are used to impregnate plaster of paris compositions (40). In another variation, bisphenol is reacted with epichlorohydrin to produce a cement having low shrinkage and excellent adhesion (141).

In spite of the lack of resistance to alkalies and inherent brittleness, coatings based on phenolic resins have been used quite generally. The original application method consisted of a multiple-coat system using a solution of a liquid phenolic resin. The solvent was removed by heating after the application of each coat, and the entire system was then partially cured by heating at 160° C. (71, 81, 106, 139, 173). A more recent improvement uses acid-catalyzed systems similar to those used for phenolic cement manufacture and hence the baking operation is eliminated (30, 62). Cements and lacquers based on phenolic resins have been used for the protection of hard rubber linings (82), lining of pipe (97), and for the manufacture of chemical equipment (1). In the field of chemical construction materials, phenol-furfural resins are considered the equivalent of phenol-formaldehyde resins. Cashew-nut oil-formaldehyde resins have also gone into chemical-resistant coatings, linings and cements (124, 183).

Furfuryl alcohol polymers—Furfuryl alcohol was first produced commercially in 1934 by the catalytic



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hydrogenation of furfuryl. Proprietary cements based on polymers of furfuryl alcohol were introduced in 1940 (135) and have been used in considerable quantities since that time. Liquid resins obtained from furfuryl alcohol alone or by reaction with aldehydes have excellent shelf-life. Cements and protective coatings based on furfuryl alcohol resins make use of much of the same art as that discussed previously for phenolic resins. The finished products are less resistant to oxidizing acids than phenolic cements and coatings, but are as resistant to non-oxidizing acids and solvents. The main advantage of the furfuryl alcohol resin results from its outstanding resistance to alkalies in all concentrations at temperatures up to 160° C. (158). Furfuryl alcohol cements and coatings can be tailor made for each specific job, and a large number of compositions are commercially available.

Norton (128) has discussed various mechanisms for furane resins, and while such nomenclature is acceptable for general terminology, it is too broad a term to describe simple polymers of furfuryl alcohol (143). Products formed from furfuryl alcohol (51) or by condensation of furfuryl alcohol with formaldehyde (144), phenol (101), or furfural (105) should be termed furfuryl alcohol polymers.

Polymers of furfuryl alcohol have been used to impregnate carbon to form a dense structure (93). More recently, furfuryl alcohol resin cements have been used both to line and build chemical equipment. The amount of material used in this type of application will rival that used for cements, once the merits of such construction are learned.

Protective coatings based on polymers of furfuryl alcohol are now available commercially and, like the previously mentioned catalyzed phenolic coatings, can be cured in the absence of added heat. These jet black coatings are resistant to most non-oxidizing acids, salts, alkalies, and solvents, but are somewhat brittle and are not recommended for temperatures above 60° C. Some of the deficiencies of furfuryl alcohol coatings have been overcome by a modification of furfuryl alcohol-type cements reinforced with glass, nylon, orlon, or Fortisan fabrics.

Other thermosetting resins—Coatings and cements based on polyester (66), urea, and melamine resins have been investigated but have not been generally accepted as corrosion-resistant materials.

Halogenated resins—Polymers and copolymers of vinyl and vinylidene chloride are commercially available as solutions, organosols, plastisols, aqueous dispersions, and calendered or extruded sheets. As previously mentioned, a large number of proprietary coatings based on a specific copolymer of vinyl chloride and vinyl acetate (70, 79) are commercially available. These products are generally applied over a primer containing polar groups (49) and then air-dried, but superior adhesion and performance is secured by baking at 150° C. (47).

Providing such coatings are solvent and pinhole-free, adequate protection against splash and fumes from most acids and alkalies is obtained (61). These coatings give some protection from dilute solutions of oxidizing acids but are not resistant to acetic acid or ketone, chlorinated, or aromatic solvents.

Solutions of plasticized polyvinyl chloride must be applied hot or in very dilute concentrations. Polyvinyl chloride has been used for both solution and sheet-lining materials (14, 18), and is more resistant to solvents and oxidizing acids than vinyl chloride-vinyl acetate copolymers (125). Butadiene-acrylonitrile rubber (83) may be used in place of liquid plasticizers, and in some instances a more heat-resistant unplasticized sheet is advised.

Plastisols are used advantageously when the article to be protected can be heated to 160° C. (57, 96, 156). These coatings have reduced resistance to heat and corrosive solutions because of the high plasticizer content but are adequate for most applications. Organosols (60) have been investigated but do not appear to have any advantages over plastisols in corrosive protection.

Polymers and copolymers of vinylidene chloride are at least as resistant as the corresponding vinyl chloride products. This material is now available in extruded form and lined pipe as well as sheet lining. The latter may be cured after application and is resistant to most acids and salts but not to alkalies.

Polymers of tetrafluoroethylene and trifluoromonochloroethylene are available from three different commercial sources in the form of sheets and aqueous dispersions. These products exhibit excellent resistance to almost all acids and solvents, but are attacked by hot fluorine and molten alkali metals (76, 145, 187). No practical method has been devised for cementing sheet polytetrafluoroethylene to metal, but a satisfactory primer is available for adhering film from aqueous dispersions (59). Techniques for depositing and curing this dispersion, while possibly satisfactory for shop application by skilled operators, have not proved practical for field application in tanks. The fusing temperature range of 325-400° C. is hotter and more critical than that to which workmen are accustomed, and the film is too thin to allow for the usual factor of safety in application.

Hydrocarbon polymers — Polyethylene (137) is available commercially as a granulated solid, aqueous dispersion (4, 69), and hot melts (166). It is not soluble in cold solvents, but hot solvent application has been investigated (146, 184). A great deal of work has been done on the flame spraying of polyethylene (68, 75, 109), but this technique is expensive and tedious. A fairly even coat may be obtained on a flat panel, but the lining of inside corners requires exceptional dexterity

(*Continued on p. 148*)

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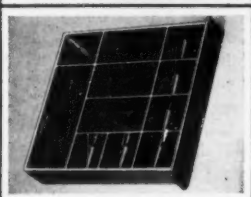
Cash drawers, other store fixture parts to stand hard usage.		High impact strength, excellent finish.	For general use, low cost: 530, 537, 560 Black or brown.
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Plastic Properties in Wood

by EARL G. HALLONQUIST†

A large number of chemicals have been tested with respect to the plastic properties which they produced in wood when used in conjunction with a high-temperature aqueous digestion. Such materials as sulfur, thiophenol, diphenylamine, and β-naphthol, in amounts of 10% based on the wood, produced a very marked improvement in plastic properties over those obtained with a high-temperature water cook alone. The chemicals giving the effect, aside from sulfur, carbon bisulfide, sodium hydrosulfide, and a few aliphatic mercaptans, were generally aromatic in nature, and were usually sulfur, nitrogen, or oxygen derivatives. The sulfur was generally in the form of a mercaptan or sulfide, the nitrogen as a secondary amine, and the oxygen as an ether or alcohol.

CONSIDERABLE research has been carried out in recent years in an effort to enhance the plastic properties of wood. Impregnation or admixture with natural or synthetic resins and plasticizers, esterification, etherification, hydrolysis with and without added chemicals, and combinations of these methods have been used.

The Forest Products Laboratory[1] has made an extensive study of the acid hydrolysis of wood for use in plastics, as also have Katzen and Othmer.[2] The acid hydrolytic treatment of wood presumably involves breaking of the cellulose-lignin bond. The carbohydrate content tends to be solubilized, while the lignin resists the hydrolytic action. Depending on the conditions and extent of the hydrolysis, the lignin develops some plastic properties.

Schorger,[3] Meiler,[4] and others have used hydrolytic methods involving high-temperature aqueous digestions of the wood or lignocellulose material, the pH of the digesting liquor being controlled by the use of alkaline buffers which neutralize excess acidity developed during the digestion. Best results are said to be obtained when the pH is in the range 4.0 to 6.5. In some cases the addition of phenol[5] or aniline[6] has been recommended, the chemical being either employed concomitantly with the hydrolysis, or admixed with the washed and dried hydrolyzed material before molding.

The beneficial action of phenol and aniline in connection with hydrolysis in enhancing the plastic properties of lignocellulose materials seemed to warrant further work along this line. The present investigation is a comparative study of the effect of a wide range of chemical compounds on the plastic properties of wood, the chemical in each case being used in conjunction with a high-temperature aqueous digestion. The reaction product of each experiment was molded under standard conditions of heat and pressure and certain physical properties of the molded material determined. From these data the comparative effect of the chemicals on the plasticity of the product could be evaluated.

Experimental

Except where otherwise indicated, all experiments were carried out as follows: A mixture of 75 g. air-dried 100-mesh Douglas Fir wood flour (6 to 7% content), 425 g. water, and 7.5 g. chemical was placed in a liter-capacity iron tube. In some cases sodium hydroxide was also added as a buffer in order to control the pH. These tubes were capped and heated at 200° C. for 30 min. in a large rotary steam digester. After cooling, the tubes were opened and the contents diluted with 500 ml. of water and the pH taken. Reaction mixtures with a pH of 5.0 or higher were acidified with 5% sulfuric acid to a pH of 3.0. All reaction mixtures were filtered and washed until the filtrate was clear. The solid residues were dried at 50° C. and conditioned to 5 ±1% moisture. The yields were calculated based on the oven-dry weight of the original wood flour used. Each product was pressed in a 3- by 6-in. mold at 1000 p.s.i. and 190° C. for 10 minutes. The flow which took place during molding was judged visually and rated as to dark, medium, or light, and the percentage of the surface that showed flow was estimated. The flexural strength and specific gravity of the molded product was determined, as well as the absorption and thickness swelling on soaking 24 hr. in water. When the material exhibited good plasticity, it was usually evident in a high percentage of dark flow in the molded specimen, together with low values for water absorption and swelling. It was thus possible to make a relative comparison of the various chemicals used with respect to their effect on wood's plasticity.

Over 800 experiments were carried out with more than 250 different chemicals, and space does not permit publication of the complete data. However, results are given in Table I for some representative experiments in which a few of the more effective chemicals can be compared with phenol, aniline, etc., and with control tests using no chemical, or only a buffer.

Results of Tests

Our investigation has shown that the majority of compounds which give added plastic properties to the wood are aromatic in nature and are also sulfur, nitrogen, or oxygen derivatives. The sulfur is usually in the form of a mercaptan or sulfide, the nitrogen as a secondary amine, and oxygen as an ether or

(*Continued on p. 152*)

†Plywood Research Foundation, Tacoma, Wash.

[1] O. O. Guss, U. S. Forest Products Laboratory, mimeographed Report No. R1481, Madison, Wis.

[2] R. Katzen and D. F. Othmer, Ind. Eng. Chem. 34, 314-22 (1942).

[3] A. W. Schorger and J. H. Ferguson, U. S. 2,247,204 (June 24, 1941); 2,247,205 (June 4, 1941).

[4] J. O. Meiler, U. S. 2,292,389 (Aug. 11, 1942).

[5] A. W. Schorger and J. H. Ferguson, U. S. 2,283,821 (May 19, 1942). A. W. Schorger, U. S. 2,319,951 (May 25, 1943); 2,319,951 (May 25, 1943); 2,319,952 (May 25, 1943).

[6] E. C. Sherrard, E. Beglinger, J. P. Hohf, and E. Bateman, U. S. 2,130,783 (Sept. 20, 1938). A. W. Schorger, U. S. 2,247,209 (June 24, 1941).

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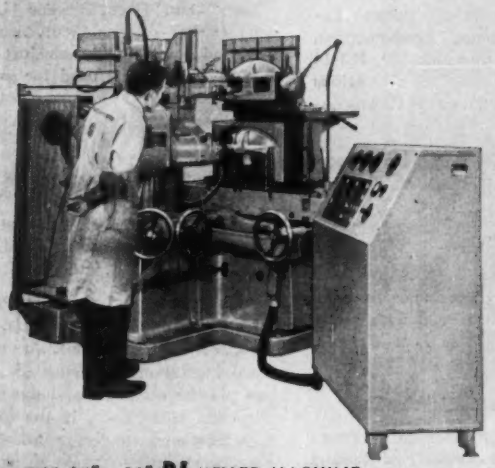

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PLASTICS DIGEST*

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General

PLASTICS AND ORGANIC CHEMICALS. J. M. Weiss. Chem. Eng. News *28*, 1554-6 (May 8, 1950). Statistics regarding the production of plastics and information relating to raw materials used in their production are presented.

THE PLASTICS LABEL PROBLEM. F. H. Carman. S.P.E.J. *6*, 5-6, 9 (May 1950). The problem of labeling plastics products is described. It is recommended that the labeling of plastics products be done more widely.

DIMENSIONAL TOLERANCES OF PLASTICS. G. S. Laaff. Prod. Eng. *21*, 159 (Apr. 1950). Commercial dimensional tolerances for sheets, rods, tubes, and molded products of laminates and various types of plastics are presented.

Materials

POLYISOCYANATES IN BONDING. T. J. Myrick and J. T. Watts. Trans. Inst. Rubber Ind. *25*, 150-66 (1949). The addition of polyisocyanates to natural and synthetic rubbers improves the adhesion to cotton, rayon, metals, and plastics.

CELLULOSE ETHERS AND THEIR USE IN THE PAPER INDUSTRY. O. Wurz and E. Wurz. Das Papier *3*, 304-10 (1949). The production and utilization of methyl, ethyl, and benzyl celluloses are reviewed. A worldwide list of producers and trade names of the cellulose ethers is given.

SILICONES, WITH REFERENCE TO SOME LABORATORY TESTS ON RESIN DC-2103. H. R. Poole. Plastics Inst. Trans. (London) *17*, No. 27, 12-31 (1949). The synthesis and properties of silicone fluids, greases, rubbers, and resins are reviewed. An asbestos-fabric silicone laminate is outstanding in electrical resistance, heat resistance, and also in water resistance.

DETERMINATION OF VOLATILITY OF PLASTICIZERS FROM SYNTHETIC MATERIALS AT HIGHER TEMPERATURES. H. Hammes. Kunststoffe *39*, 213-14 (1949). The volatility of various plasticizers at 100 to 210° C. was determined.

THERMOSETTING PLASTICS FROM FURFURAL AND PYROGALLOL. Teh-Hsi Wang and Pen-Hsi Mai. J. Chem. Eng. China *16*, 2508 (1949); Chem. Abstracts *44*, 368 (Jan. 10, 1950). A thermosetting resin is produced by condensing 1.2 mols of pyrogallol with 1 mol of furfural with dilute sulfuric acid catalyst in 90 min. at 100° C.

Molding and Fabricating

THEORY OF THE MECHANICAL PROPERTIES OF HOT PLASTICS. S. J. Loring. Trans. A.S.M.E. *72*, 447-63 (May 1950). A theory of large-strain, rubber-like elasticity combined with stress relaxation, which is the character of the behavior of hot plastics, is described.

SURFACE DYEING OF PLASTICS. Brit. Plastics *22*, 190-4 (Apr. 1950). Procedures and dyes used for the surface dyeing of various types of plastics are described.

RESINATED SAND MOLDS. L. N. Phillips. Brit. Plastics *22*, 197-204 (Apr. 1950). Dies for low pressure molding are made of sand and a furan resin. The procedures are described in detail.

Applications

PLASTICS IN THE PLATING SHOP. V. Evans. Brit. Plastics *22*, 162-70 (Apr. 1950). The conditions encountered in electroplating plants require that equipment withstand hard usage and have resistance to corrosive chemicals. Plastics materials find many uses in this industry because of their good wearing and chemical resistant properties. Polyethylene, phenolic, furan, cashew nut shell, methyl methacrylate, alkyd, polyvinyl chloride, coumarone, styrene, polyurethane, and chlorinated-rubber plastics are used for floor coverings, filling compounds for cracks and joints in masonry, adhesives, tank linings, drains, pipe valves, coatings, plating barrels, ventilating ducts, racks, jigs, anode bags, filter cloths, and pump parts.

THE "RESIL" PACK. Plastics (London) *15*, 140-1 (May 1950). A felt-like product made from sawdust and a synthetic resin is used for packaging batteries, relays, bottled goods, and small electrical appliances.

CONSTRUCTION MATERIALS AT THE 1949 CHEMICAL SHOW. Chem. Eng. *57*, 114-15 (Jan. 1950). Applications of plastics and other materials in chemical equipment are described.

APPLICATION OF LOW-LOSS PLASTICS. J. Delmonte. Elec. Mfg. *45*, 80-3, 190, 192 (May 1950). The electrical insulation properties of low-loss plastics materials and their applications particularly in the ultra-high frequency range are described. Factors affecting these properties are also considered.

Properties

STRENGTH PROPERTIES OF RAYON-MAT HONEYCOMB CORE MATERIALS. W. J. Kommers. National Advisory Committee for Aeronautics Technical Note 2084, 21 pp. (April 1950). The strength and elastic properties of honeycomb-type core materials fabricated from resin-impregnated rayon-mat fabrics were measured. Cores were made with 30- and 45-lb. rayon mat fabrics corrugated either parallel or perpendicular to the preferred direction of the individual fibers of the mat and with the contact resin content of each core approximately either 70 or 20% of the total weight of the finished core. The tensile strength of the higher-resin-content, 45-lb. rayon-mat cores having the fiber direction parallel to the axes of the cells, was approximately 40% greater than the strength of paper honeycomb-core material of equal density having the fiber direc-

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Electrode dimensions: (standard)	20 x 20 inches

All steel construction with copper plating where necessary, totally enclosed

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tion perpendicular to the axes of the cells. However, the compressive strength, modulus of elasticity, shear strength, and modulus of rigidity of the rayon honeycomb were approximately one-half of the values for the corresponding properties of the paper honeycomb. Considerably reduced strength values in compression and shear were obtained from tests of the rayon cores of lower resin content. The tensile strength of the cores having a contact resin content of 20% was higher on a specific strength basis than that of the cores having a contact resin content of 70%. Cores with the fiber direction perpendicular to the axes of the cells had lower tensile and compressive strengths, but higher shear strength, than the cores having parallel fiber orientation. Honeycomb-core materials fabricated from resin-impregnated rayon-mat fabric do not appear to be better over-all core materials for use in sandwich construction than resin-impregnated paper honeycomb cores of equal density.

DYNAMIC MECHANICAL PROPERTIES OF POLYMER-PLASTICIZER SYSTEM. L. Nielsen and R. Levreault. Nature *164*, 317-18 (1949). The dynamic modulus of polyvinyl chloride mixtures plasticized with various esters of phthalic acid changes slowly with changes in temperature above and below the transition region and very rapidly in the transition region from a rigid to an elastomeric material while damping goes through a maximum. A plot of the temperature of maximum damping vs. volume fraction of plasticizer is a straight line.

COMPLEX STRESSING OF POLYETHYLENE. I. L. Hopkins, W. O. Baker, and J. B. Howard. J. Applied Phys. *21*, 206-13 (Mar. 1950). Polyethylene of such molecular weight and structure that it readily fibers or cold draws to 300-600% elongation by usual uniaxial, tensile stressing may react quite differently under biaxial tension. When biaxial tension in 1:1 ratio is applied to a diaphragm, some polymers show brittle fracture with less than 20% elongation at break. However, if the average molecular weight of such polyethylenes is shifted upward by crude fractionation, or an initially higher average is used, the polymers orient under complex stresses. Then, they usually elongate several hundred percent before rupture. Variations in crystallinity are also significant, although most technical polyethylene soon attains at room temperature enough crystallinity so that this factor does not cause big differences. X-ray scattering of stressed samples suggests that preferred glide on certain crystallite planes tends to occur as the yield point approaches. These are such as to inhibit smooth alinement of the long chain axis in the direction of stressing. This could lead to brittleness. Apparatus for complex stressing of sheets and tubes is described. Strains are taken from coordinates printed on the sample by the silk screen process. High speed stressing was also observed. The speed of retraction of amorphous polyethylene chains nears that of rubber.

Testing

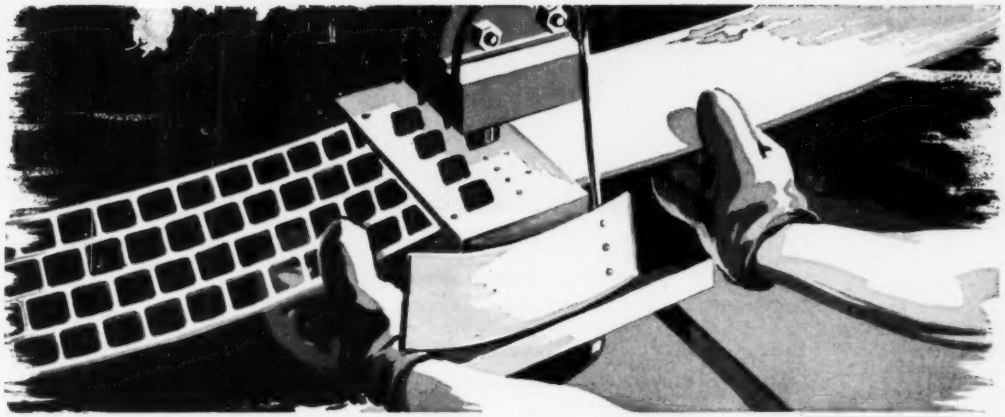
SOME INSTRUMENTS FOR MEASURING THE DYNAMIC MECHANICAL PROPERTIES OF PLASTICS MATERIALS. L. E. Nielsen. A.S.T.M. Bull. No. 165, 48-52 (Apr. 1950). A torsion pendulum and a resonating reed vibrator for determining the shear modulus, Young's modulus, and mechanical damping of plastics are described.

EQUIPMENT FOR THE DETERMINATION OF INSULATION RESISTANCE AT HIGH RELATIVE HUMIDITIES. A. T. Chapman. A.S.T.M. Bull. No. 165, 43-5 (Apr. 1950). A special oven and related equipment for determining insulation resistance at high relative humidities are described.

STRENGTH-VARIANCE STUDIES OF PLASTICS. W. J. Gailus, S. Yurenka, and A. G. H. Dietz. Trans. A.S.M.E. *72*, 299-307 (Apr. 1950). A variance analysis of causes and interaction terms indicates that studies correlating structural characteristics of a material, whether chemical, metallurgical, etc., with its physical properties had best be done by testing samples whose homogeneity and degree of reproducibility of a material are understood and can, therefore, be taken into consideration. The importance of considering interaction effects is indicated. The latter, if not considered, can easily lead to false conclusions or effectively mask effects that may occur. In the case of the plastics materials analyzed it was found that in order to eliminate as many interactions as possible, future testing should be carried out using material (for particular phases of the work) from a single manufacturer, with samples taken from panels of the same thickness, using a predetermined random sampling procedure for obtaining specimens, and using material which has been prepared by a carefully controlled technique.

TENTATIVE TEST SPECIFICATIONS AND REQUIREMENTS FOR THERMOPLASTIC ENCLOSURES FOR ELECTRICAL APPLIANCES. S.P.E. J. *6*, 5, 10 (Apr. 1950). Recommended requirements and methods of test for thermoplastic enclosures for electrical appliances are given.

SPECTRAL CHARACTERISTICS OF LIGHT SOURCES FOR FADING AND DEGRADATION TESTING. B. S. Cooper and F. S. Hawkins. Soc. Dyers & Colourists *65*, 586-96 (Dec. 1949). Several light sources used in accelerated weathering tests were investigated. The data given show that none of the light sources investigated has a spectral distribution similar to sunlight. The enclosed flame arc resembles sunlight only to the extent that the proportion of radiant power emitted in the region 3000-4300 A. is approximately the same as that of noon summer sunlight. In other regions of the spectrum the proportions emitted by the arc differ considerably from those given by the sun. The two principal factors affecting the distribution of energy in the spectrum of the enclosed flame arc are the composition of the surrounding atmosphere and asymmetrical burning of the arc. Variations of this kind can be minimized by avoiding air leaks, e. g., between globe and bedplate, and by avoiding disturbing magnetic fields or other sources of misalinement of the arc. The total radiation depends upon the electrical power input, which should vary as little as possible in both current and voltage. Fume deposited on the globe from the arc causes the radiation to be diffused rather than absorbed. The high-intensity arc is, of all the light sources examined, the nearest to noon sunlight in its spectral characteristics. This type of arc, however, cannot be left to burn unattended for periods of several hours.



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U. S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25¢ each.

UREA RESINS. W. L. Morgan (to Arnold, Hoffman). U. S. 2,501,783, Mar. 28. Condensing boric acid and a urea condensate with heat.

CONDENSATES. S. O. Greenlee (to Devoe and Raynolds). U. S. 2,502,-145, Mar. 28. Reacting a phenol-oil condensate with a complex resinous epoxide having aliphatic and aromatic nuclei to obtain a drying composition.

THERMOPLASTIC. F. E. Wiley (to Plax). U. S. 2,502,240, Mar. 28. Cutting an article from thin gage sheet and heating to relax the article to a heavier gage.

LAMINATES. F. J. Sowa. U. S. 2,502,286, Mar. 28. A laminated sheet of material bonded with a thermoset silicone.

EXPANDED PLASTIC. W. O. Baker (to Bell Telephone). U. S. 2,502,304, Mar. 28. A rigid board comprising thin spaced skins joined by connecting bridges of expanded plastic material.

LAMINATES. J. D. Pickens (to Du Pont). U. S. 2,502,340, Mar. 28. Cellulosic laminae bonded together with a N-alkoxymethyl polyamide.

POLYVINYL CHLORIDE. J. K. Carver (to Monsanto) U. S. 2,502,370-1, Mar. 28. Polymers of vinyl chloride plasticized with pentaerythritol tetrabenzoate or diphenyl phthalate.

ACRYLATES. H. T. Neher, W. R. Conn, and E. H. Kroeker (to Rohm and Haas). U. S. 2,502,411, Apr. 4. Copolymer of zirconyl methacrylate and an ester of methacrylic acid.

RESIN. W. D. Fleming. U. S. 2,502,-446, Apr. 4. Synthetic resin for use as mounting for microscopic specimens prepared by reacting naphthalene and formaldehyde in the presence of an acid catalyst.

LINOLEUM COMPOSITION. J. S. Heckles (to Armstrong). U. S. 2,502,457, Apr. 4. A siccative oil gel, a filler, and a mixture of a copolymer of vinyl chloride and vinyl acetate and a plasticizer.

MOLDING COMPOSITION. R. V. Williamson and T. F. Clark (to U. S.). U. S. 2,502,498, Apr. 4. Thermosetting molding composition of phenol-formaldehyde resin, lignocellulose, and an inorganic extender.

RESORCINOL RESINS. D. N. Davies and F. S. Deutsch (to British Resin Products). U. S. 2,502,511, Apr. 4. Mixing resorcinol with aqueous formaldehyde, slowly heating to boil, and thereafter adding formalin to obtain a thermosetting composition.

DRYING COMPOSITIONS. S. O. Greenlee and J. D. Zech (to Devoe and Raynolds). U. S. 2,502,518, Apr. 4. Drying compositions of linear polyesters of dimeric unsaturated oils with dihydric phenols having the phenolic hydroxyls attached to separate phenol residues.

MOLDING POWDER. D. W. Hansen (to A. E. Staley Mfg.). U. S. 2,502,-520, Apr. 4. Preparation of molding powder containing starch and an aminotriazine-formaldehyde resin.

POLYAMIDES. S. J. Allen and J. G. N. Drewitt (to Celanese). U. S. 2,502,548, Apr. 4. Heating in *m*-cresol an α,α'-di-primary aminosebacic acid ethyl ester.

POLYAMIDES. J. Lincoln and J. G. N. Drewitt (to Celanese). U. S. 2,502,576, Apr. 4. Condensing the di-formyl derivative of a di-primary diamine with 1,3,5-pentane-tricarboxylic acid until a linear fiber-forming polymer is formed.

RESINS. R. W. Watson (to Council for Scientific and Industrial Research). U. S. 2,502,686, Apr. 4. Reacting butanediol with phthalic anhydride under atmospheric pressure in an inert atmosphere.

POLYVINYL ALCOHOL. L. M. Germain (to Shawinigan). U. S. 2,502,715, Apr. 4. Production of polyvinyl alcohol by alkaline alcoholysis of a polyvinyl ester.

RUFFLED SHEET. T. W. Winstead. U. S. 2,502,772, Apr. 4. Method of producing a gather or ruffle in elastic heated thermoplastic sheet.

POLYETHYLENE. W. F. Henderson (to Visking). U. S. 2,502,841, Apr. 4. Subjecting the surface of polyethylene film to gaseous chlorine and then printing.

PLASTICIZER. M. A. Kise (to Allied Chemical). U. S. 2,502,962, Apr. 4. Cellulose ester or ether plasticized with an α-alkenyl succinimide.

RESIN. A. S. Nyquist and E. L. Kropa (to American Cyanamid). U. S. 2,503,209, Apr. 4. A polymerizable reaction product of an unsaturated alkyd reacted with an unsaturated isocyanate.

ACRYLONITRILE. H. W. Coover, T. E. Stanin, and J. B. Dickey (to Eastman). U. S. 2,503,244-5, Apr. 11. Polymers of acrylonitrile containing in the molecule acrylonitrile, N,N-dimethylformamide, and an inorganic phosphorus compound or an organic acid.

HALOGENATION. M. L. Ernsberger (to Du Pont). U. S. 2,503,252, Apr. 11. Method for replacing an atom in a polymer by halogen using an aliphatic azo compound as reaction initiator.

STYRENE POLYMERS. E. P. Irany and A. J. Geraci (to Celanese). U. S. 2,503,338, Apr. 11. Recovery of polymerized styrene from aqueous emulsions consisting of adding to a solution of alkali and washing the precipitate to a pH of 8 with the same alkali.

LAMINATED FIBERBOARD. H. J. Perry (to J. P. Lewis). U. S. 2,503,407, Apr. 11. Subjecting wood blocks to steam, grinding, preparing a beater furnish with the ground wood and pine wood pitch, beating, preparing a web, drying partially, coating with synthetic resin, and molding several sheets under heat and pressure.

POLYMER. D. E. Adelson and H. Dannenberg (to Shell). U. S. 2,503,-699, Apr. 11. Heating allyl acetoxyacetate in the presence of a peroxide polymerization catalyst.

POLYMERIC POLYHYDRIC ALCOHOLS. S. O. Greenlee (to Devoe and Ray-

nolds). U. S. 2,503,726, Apr. 11. Polymeric polyhydric alcohols having a plurality of alternating aliphatic and aromatic nuclei united through ether oxygen and having a plurality of hydroxyl groups.

TALL OIL ESTERS. J. B. Rust (to Montclair Research). U. S. 2,503,772, Apr. 11. A heat-convertible coating comprising a polyhydric alcohol esterified with tall oil and dicarboxylic acid monoester of a β-unsaturated monohydric alcohol having 3 to 4 carbon atoms.

POLYMERS. W. J. Hornibrook (to Canadian Industries). U. S. 2,503,873, Apr. 11. Dissolving a polyvinyl acetal in 4-vinylcyclohexene dioxide and polymerizing the latter with a catalyst.

POLYSILOXANEAMINES. W. I. Patnode (to G. E.). U. S. 2,503,919, Apr. 11. Composition comprising a mixture of alkyl polysiloxaneamines and a reaction product of anhydrous ammonia and an alkylchloropolysiloxane.

POLYMER SALTS. M. E. Cupery (to Du Pont). U. S. 2,504,003, Apr. 11. The ammonium salt of an N-hydroxymethyl polymeric amide of an interpolymer of a polymerizable organic compound containing ethylenic double bonds with an unsaturated acid anhydride.

POLYMETHACRYLIC ACID. L. M. Richards (to Du Pont). U. S. 2,504,049, Apr. 11. Dissolving an ester of polymethacrylic acid in sulfuric acid, aging, and diluting to obtain polymethacrylic acid.

INTERPOLYMERS. R. H. Snyder (to U. S. Rubber). U. S. 2,504,052, Apr. 11. Heating a monomeric allyl fumarate in the presence of allyl alcohol and a peroxide catalyst.

CHLORINATED RUBBER. La V. E. Cheyney (to Wingfoot). U. S. 2,504,065, Apr. 11. Composition of chlorinated rubber, a phospholipide, and a solvent.

INTERPOLYMERS. G. D. Jones (to General Aniline). U. S. 2,504,074, Apr. 11. A composition of gelatin and an interpolymer of methacrylamide and acrylamide.

POLYMERS. H. T. Neher, W. J. Croxall, and E. H. Kroeker (to Rohm and Haas). U. S. 2,504,082, Apr. 11. Polymers of acrylic esters of alkoxy-3-butenols.

PHENOL-ALDEHYDE RESINS. C. J. Plank and D. E. Badertscher (to Socony-Vacuum). U. S. 2,504,100, Apr. 18. Preparing light-colored to white thermosetting resins of the phenol-aldehyde type by condensing the base material in the presence of boron trifluoride.

POLYVINYL COMPOSITIONS. H. R. Gamrath (to Monsanto). U. S. 2,504,120, Apr. 18. A polyvinyl chloride resin plasticized with a monoalkyl diaryl phosphate ester.

TEXTILE DECORATING. S. Lee (to Interchemical). U. S. 2,504,136, Apr. 18. Textile decorating composition comprising a water-in-lacquer emulsion of a copolymer of a monovinyl aromatic compound and an aliphatic diolefin and a solution of a thermosetting resin.

POLYETHYLENE. F. H. MacLaren and J. A. Anderson (to Standard Oil). U. S. 2,504,270, Apr. 18. Milling polyethylene with petroleum wax and dissolving in petroleum wax.

MIXING MACHINE. E. G. Loomis. U. S. 2,504,337, Apr. 18. A machine for mixing plastic materials.

POLYSILOXANES. O. A. Braley (to Dow Corning). U. S. 2,504,338, Apr. 18. Siloxane resin composition containing lead 2-ethylhexoate and dibutyl tin acetate.

POLYETHYLENE. M. Erchak, Jr. (to Allied Chemical). U. S. 2,504,400, Apr. 18. Production of high melting waxes from ethylene.

LAMINATES. C. H. Hofrichter (to Du Pont). U. S. 2,504,417, Apr. 18. Sheets of regenerated cellulose bonded face to face with a thermoplastic unsaponifiable neutral β-pinene resin, a polybutene resin, and an interpolymer of vinylidene chloride and vinyl chloride.

CATALYST. J. A. McCoubrey and M. Kiar (to Shawinigan). U. S. 2,504,436, Apr. 18. Polymerizing polyvinyl acetate with acetyl peroxide in toluene or vinyl acetate.

TUBE FORMING. F. V. Collins (to W. F. Stahl). U. S. 2,504,500, Apr. 18. Apparatus for forming a tube from sheets of fusible flat thermoplastic material.

DRYING COMPOSITIONS. S. O. Greenlee (to Devoe and Raynolds). U. S. 2,504,518, Apr. 18. A mixed ester of maleic anhydride, oleic acid, and a high molecular weight polymeric polyhydric alcohol.

POLYVINYL ACETAL. R. P. Dunlop (to Monsanto) U. S. 2,504,667, Apr. 18. Aqueous dispersions of polyvinyl acetal resins prepared with the aid of alkali salts of long-chain fatty acids.

EMBOSSING. L. L. Young (to R. L. Wilmotte). U. S. 2,504,780, Apr. 18. Method and apparatus for embossing thermoplastic sheets.

RESIN. P. S. Hewett and R. E. Carter (to Reichhold). U. S. 2,504,835, Apr. 18. Reacting a ketone with formaldehyde in the presence of a non-alkaline catalyst.

SILOXANES. J. F. Hyde (to Corning Glass). U. S. 2,504,839, Apr. 18. Copolymeric organosiloxane.

CREASE RESISTANCE. W. R. MacIntyre (to Joseph Bancroft and Sons). U. S. 2,504,857, Apr. 18. Impregnating fabric with aqueous methylol melamine, and curing.

POLYVINYL CHLORIDE. S. J. Hetzel (to Sun Oil). U. S. 2,504,929-30, Apr. 18. Polyvinyl chloride resin plasticized with 1,5-pentanediol biscyclohexylacetate or 1,5-pentanediol difuroate.

ROSIN ESTERS. R. V. Lawrence and M. W. Kaufmann (to U. S.). U. S. 2,504,989, Apr. 25. Heating rosin with lactic acid and pentaerythritol.

CELLULOSE PLASTIC. W. E. Gloor (to Hercules). U. S. 2,505,039, Apr. 25. Thermoplastic composition of granules of cellulose derivative mixed with a polymerizable material.

PHOTOPOLYMERIZATION. C. C. Sachs and J. Bond (to A. H. Kerr). U. S. 2,505,067, Apr. 25. Photopolymerization of unsaturated material with a photopolymerization catalyst.

SHEET MATERIAL. W. H. Ryan (to Polaroid). U. S. 2,505,146, Apr. 25. Process and apparatus for stretching continuous sheet material.

DRYING OIL. V. Schneider (to Phillips Petroleum). U. S. 2,505,148, Apr. 25. Drying oils and process for making same from the naphthene-rich fraction of clay tower polymers.

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BOOKS AND BOOKLETS

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"Modern Plastics Encyclopedia and Engineer's Handbook 1950."

Published by Plastics Catalogue Corp., 122 E. 42nd Street, New York 17, N. Y. 1212 pages. Price $3.00.

Emphasis in this latest edition of a volume which has been published annually since 1939, is on the most recent developments in the fields of plastics engineering. The engineering section of the 1950 volume has been greatly expanded and is divided into four units: Molding Design Factors; Molding, Extruding, and Casting; Fabricating and Finishing; and Machinery. Every article in these divisions is packed full of "know-how," and is lavishly illustrated with drawings and pertinent photographs. For example, under "Types of Molds," actual engineering mold drawings are reproduced in their entirety. Under "Engineering Design," specific examples are presented to show how the new product is most economically brought from the point of the rough sketch to the final finished stage in molded plastics. This same article also includes a chart for calculating weight of a molded piece when volume in cubic inches is known and a series of curves for determining material cost for any weight of mold piece. The other articles in the Engineering section are equally comprehensive.

All of the articles on various plastics materials have been brought completely up to date, and the now-famous charts of the technical section have been revised to include the latest information.

The Directory section, invaluable to those who buy plastics materials, machinery, and other supplies has also been thoroughly revised.

"Colloid Science II."
Edited by H. R. Kruyt

Published by Elsevier Publishing Co., Inc., 215 Fourth Ave., New York 3, N. Y. 753 pages. Price $14.50.

Despite the bulk of this volume, the editor states that it "has no pretention of being a complete treatise." Rather, it is designed as a guide to researchers in the field of colloids.

The subjects treated are classified according to general phenomena and not according to particular substances or systems. Many experimental data are given.

"A Dictionary of Electronic Terms". Edited by Harry L. Van Velzer.

Published by Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill. 64 pages. Price $.25.

Answering the need for an accurate, up-to-date reference source for words used in the rapidly expanding electronics field, this dictionary contains over 2500 terms used in television, radio and industrial electronics.

Over 125 illustrations and diagrams of components, equipment, and electronic circuits are included.

"Bibliography on Machinery Foundations."

Published by Engineering Societies Library, 29 W. 39th St., New York 18, N. Y. Price $2.00.

Selected books and periodical articles published from 1924 to 1949 on the theory, design and construction of machinery foundations have been compiled in this handbook of 120 annotated references. The references also cover specific problems such as heavy machinery foundations on unstable soils, and vibration problems related to foundations of hammers, engines, electrical machinery, turbines, compressors, machine tools, pumps, and presses.

"The Acrylic Plastics in Dentistry," by Jacob R. Schwartz, D. D. S.

Published by Dental Items of Interest Publishing Co., Inc., 2911-23 Atlantic Ave., Brooklyn 7, N. Y. 447 pages. Price $11.00.

Preparation of this definitive work followed in the wake of heavy demand by dentists for clarifying information on the role of plastics in their profession. The advent of acrylics is said to have filled a void that presented disturbing problems in the dental field for many years. This volume presents a survey of the literature and available related data on the subject to permit the reader to obtain a broad picture of the industry and find answers to his questions. It also recommends practical and clinical procedures and techniques that may best be employed in the construction of various types of dental restorations.

"Paper Base Laminates," by S. E. Sorrell

Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. 223 pages. Price $2.75.

A concise account of the manufacture, characteristics, testing, and uses of laminates composed of resins reenforced with paper sheets is presented in this book. The author has made a survey of the entire field with the objective of coordinating literature on the subject accumulated during the last 30 years.

Paraplex "P" series resins—Data on uses of the Paraplex "P" series resins (solutions of polyester resin in styrene) in the laminating, molding, potting, and casting fields are presented in this 24-page booklet. Tables and charts define the properties of P-43, P-43HV, and P-13. Additional material recommends techniques for blending, laminating with glass fibers, compounding and curing, and using filler, pigments, and dies. *Resinous Products Div., Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.*

The chemistry of guanidine—The chemical and physical properties of the compound, the synthesis of guanidine, methods of analysis, toxicity, and potential applications in a number of fields are covered in this booklet. Inasmuch as the guanidine structure is involved in a number of important synthetic plastics, pharmaceuticals, dyestuffs, and explosives the booklet will have particular value for the research chemist. *American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.*

Crotonaldehyde—Specifications and properties of Crotonaldehyde, an unsaturated reactive aldehyde, are set forth in a recently issued technical data sheet. At the same time, a number of proposed applications are outlined, including the liquid's use as a specialty solvent and as an intermediary in the preparation of

synthetic resins, vulcanization accelerators, dyes, and synthetic pyrethrins. *Tennessee Eastman Corp., Kingsport, Tenn.*

Polyethylene in bottles—Recent applications of unbreakable Plaxpak polyethylene bottles in drug, cosmetics, and other fields are summarized in a four-page illustrated folder. In addition, three new stock molds are described. *Plax Corp., P.O. Box 1019, Hartford 1, Conn.*

Plastic coatings—Latest developments in the company's continuing field and laboratory work with coating materials and methods are reported in a technical bulletin. Described are several new types of Logoquant, which was originally developed to provide a hard, scratch- and solvent-resisting surface for styrene pieces, and which has given rise to a whole family of related materials. Their applications to vinyl, acrylic, phenolic, and some cellulose plastics are discussed. *Bee Chemical Co., 13799 South Ave. "O", Chicago 33, Ill.*

Functional photography in industry—Applications of photography in business and industry are summarized in this 16-page booklet. The text, prepared in non-technical language, describes the processes and techniques of photocopying, microfilming, photomicrography, analysis by light, and instrument recording. Numerous illustrations depict the adaptability of these methods to research, production, and quality control, and their effectiveness as a medium for training, advertising, and sales. *Industrial Photographic Div., Eastman Kodak Co., 343 State St., Rochester 4, N. Y.*

German patent applications guide—This index to wartime German patent applications, translated by the Office of Technical Services of the U. S. Department of Commerce, summarizes the 200,000 applications filed in the Berlin Patent Office from 1940 to 1945 which may now be used freely in Allied countries. The subject index breaks down these applications into 13 major industrial groups, 89 classes, and some 500 subclasses. Companies interested in obtaining further information on patent applications in their fields of interest may purchase German-language abstracts of them which are also listed in this guide. Microfilm copies of complete patent applications are available at $3.00. *Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.*

Study of solubility—The solubility at room temperature of 33 castor oil products with 46 common commercial solvents is given in this four-page bulletin. The company has selected products typical of the classes of materials manufactured. All the castor oil products tested were found miscible in 23, or one half, of the solvents evaluated. Other cases of solubility or limited solubility are tabulated in chart form. In cases of limited solubility, the immiscible range of the mixture is reported in terms of percent castor oil product present (weight basis). *The Baker Castor Oil Co., 120 Broadway, New York 5, N. Y.*

Synthetic waxes—Facts, figures, and specifications on synthetic waxes are presented in this 18-page catalog which gives complete physical and use data. The waxes are required in many industries for such things as lubricants for plastics, rubbers, and metals, and in electrical insulation, polishes, and paints. *Glyco Products Co., Inc., 26 Court St., Brooklyn, N. Y.*

Drafting templates, Catalog No. 50—Templates for the use of engineers, draftsmen, architects, and designers are illustrated and described in an 8-page booklet. Standard units give squares, circles, radii, ellipses, nuts and bolts, gear sizes, traffic markings, and architects' symbols. Examples are shown of templates made on order to meet specifications of individual companies. *Rapidesign, Inc., Box 592, Glendale, Calif.*

Nylon in curtains—Issued as part of the firm's educational program is this 10-page booklet designed to assist in sales training for retail store personnel when handling nylon curtains. Written from a consumer appeal point of view, the information covers the properties offered the prospective buyer, the variety of fabrics—such as marquisette, organdy, and lace—in which the curtains are available, and suggestions for the care and cleaning of the fabric. *E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.*

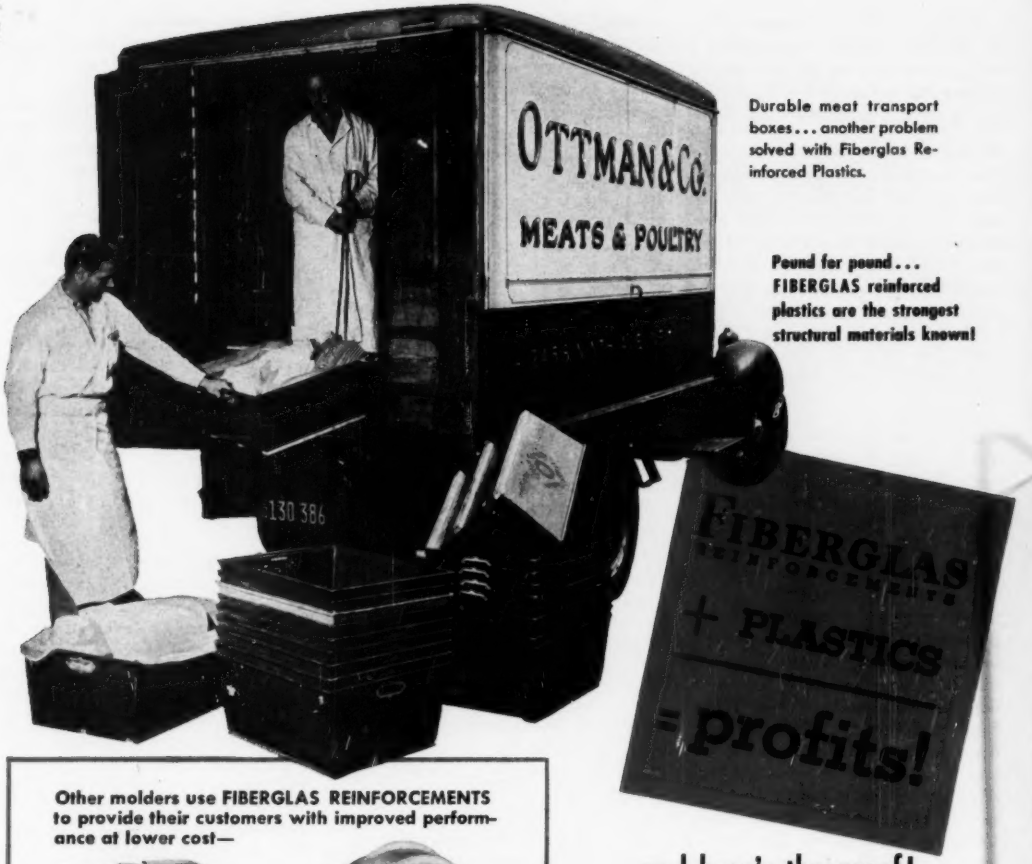
Cadmium stearate—Cadmium stearate for light and heat stabilization of transparent film, sheeting, and extruded compounds, where maximum clarity is desired, is described in this service report. *Witco Chemical Co., 295 Madison Ave., New York 17, N. Y.*

Vibratory feeders—Pictures and complete specifications in a 16-page brochure describe the company's line of equipment which includes Vibra-Flow vibratory feeders, long conveyors, multiple magnet models, furnace feeders, and infra-red dry feeders. Accessory equipment is also illustrated. *Syntron Co., Box 220, Homer City, Pa.*

Make it yourself—Solutions to many housekeeping problems are suggested in this eight-page illustrated booklet that shows how to use Vinylite to decorative advantage around the house. Slip covers, draperies, table covers, food bags, aprons, and stuffed toy animals are a few of the items that can be made of this material. Full directions are given. *Dept. 15, Bakelite Div., Union Carbide and Carbon Corp., 300 Madison Ave., New York 17, N. Y.*

Universal testing machine, Bull. 310—Specifications and construction highlights of the new, low-cost Model 60-H Baldwin-Sonntag universal testing machine of 60,000-lb. capacity are presented in this four-page release. Illustrations and sketches provide information on the equipment's operation. *The Baldwin Locomotive Works, Testing Equipment Dep't., Philadelphia 42, Pa.*

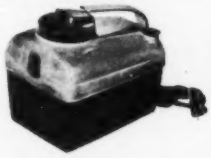
Speed variator—All the features in the company's speed variator—a packaged unit providing a DC motor operating from AC power—are presented in this eight-page booklet which explains when and where to use the unit and the braking and speed features that can be specified. Applications to which the unit can be put include winding, mixing, heat treating, coating, calendering, metal working, testing, and pumping. Speed specifications, alone or in combination, range from wide speed, good regulation, controlled acceleration and deceleration, jogging



Durable meat transport boxes... another problem solved with Fiberglas Reinforced Plastics.

Pound for pound... FIBERGLAS reinforced plastics are the strongest structural materials known!

Other molders use FIBERGLAS REINFORCEMENTS to provide their customers with improved performance at lower cost—



Heat- and corrosion-resistant vaporizer housings made by The Spartan Co.

Permanently resilient, cool, comfortable Bullard Helmets molded by Automatic Plastics Co.

Rugged, lightweight, attractive clarinet cases molded by Auburn Button Works.

OWENS-CORNING
FIBERGLAS

...and here's the proof!

MOLDER:
The Anderson Box & Basket Company, New York, N. Y.

MATERIAL:
Polyester resins reinforced with FIBERGLAS* mats.

PRODUCTS:
Deep boxes for meat transport; bread boxes and tote trays.

results:

Greater profits, increased sales, and satisfied customers for the molder.

A better box at lower per trip cost for the meat packer and baker.

FIBERGLAS IS IN YOUR LIFE . . . FOR GOOD!

INVESTIGATE THESE NEW ENGINEERING MATERIALS AND COST-SAVING PROCESSING TECHNIQUES FOR YOUR PRODUCTS. WRITE Owens-Corning Fiberglas Corporation, Plastics Reinforcement Division, Dept. 876, Nicholas Building, Toledo 1, Ohio.

*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with glass fibers.

and creep speeds, and preset speed to dynamic braking, regenerative and reverse braking, and reversing, jogging and dynamic braking. *General Electric Co., Schenectady, N. Y.*

Machining nylon—Machining operations commonly used on nylon bar stock are described in this new bulletin. Tooling and recommended production procedures are outlined for such operations as turning, drilling, sawing, centerless grinding, threading, and tapping. Principal nylon formulations considered are FM-10001, FM-3001, FE-1044, and FE-2031. *The Polymer Corp., Reading, Pa.*

Furfural in phenolic resins—Test methods and results of the company's recent experiments on the role of furfural and furfuryl alcohol as reactive solvents for phenolic resins are set forth in this three-page release. Investigating the question, "are furfural and furfuryl alcohol merely solvents for the phenolic resin, or do they react and become a part of the phenolic binder?", the company's laboratory demonstrations indicate that 1) furfural and furfuryl alcohol readily dissolve the phenolic resins tested, and 2) only a very small quantity of either solvent is lost by evaporation during curing of the resin. Complete details of the test method are included. *The Quaker Oats Co., Chemicals Dept., 141 W. Jackson Blvd., Chicago 4, Ill.*

Injection molding equipment—Complete specifications and design features for two new additions to the company's line of machinery are contained in this four-page folder. A high-speed 3-oz. injection molding machine is automatically operated, so that one operator can run three machines. The other machine, built for high-capacity plastics molding, handles up to 10 oz. of acetate per shot. *The Fellows Gear Shaper Co., Springfield, Vt.*

Carbon black dispersions—A compact summary of technical data and operating suggestions covering "dag" concentrated carbon black dispersions is available in this four-page brochure. A brief explanation of the advantages of predispersed carbon black dispersions is supplemented by particular descriptions of application, characteristics, composition, and handling of seven standard "dag" carbon black dispersions. These are used for coloring styrene molding powders or scrap, ethyl cellulose, virgin or scrap polyethylene, cellulose acetate molding powders, vinyl wire coatings, and general pigmentation of resins. *Acheson Colloids Corp., Dispersed Pigments Div., 420 Lexington Ave., New York 17, N. Y.*

Testing by the National Bureau of Standards—In answer to the many inquiries received from industry, the National Bureau of Standards has published a 93-page circular fully describing its testing policy, presenting general information on testing, and listing fees for most of the test work that is done. Fees listed include those for tests on electrical standards and instruments; standards of length, mass, and time; pyrometers; fuels; radioactive standards; mechanical and optical instruments. This circular may be obtained for 25¢ from *Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.*

Reference guide for the patent field—Designed as an aid to industry and the patent field, this sixth national guide facilitates the marketing of new inventions by presenting information on the companies interested in outside help, their specific fields of interest, and the kinds of ideas they seek. Listings of receptive concerns appear in two sections. The first groups manufacturers interested in new inventions on their own account into certain broad categories according to the chief interests of the companies. The second is an alphabetical listing of service organizations seeking ideas for industrial clients. Single copies are available at $2.50 from *The Green Leaf Guide, Port Washington, N. Y.*

Plastic selling containers—Uses and advantages of Clearsite plastic selling containers to manufacturers in various markets are illustrated in this four-page folder. A list of stock sizes is included. *Celluplastic Corp., 50 Ave. L, Newark 5, N. J.*

Alkyl acid phosphates—Physical properties, solvent compatibility, and suggested uses for the firm's alkyl alkali and alkyl acid phosphates are contained in two new companion technical bulletins. *Monsanto Chemical Co., St. Louis 4, Mo.*

Ovens and incubators—Five new models are included in this brochure describing the redesigned line of Thelco ovens and incubators. The eight-page bulletin is profusely illustrated and contains liberal data on construction, performance, and application. *Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill.*

Starch data sheet—Step-by-step recording of necessary information required for proper analysis of dextrine and starch product problems is said to be simplified by this new, questionnaire-type, operation data sheet recently released. *Morningstar, Nichol, Inc., 630 W. 51st St., New York 19, N. Y.*

Titanox pigments—Properties and uses of Titanox titanium dioxide pigments are outlined in this highly detailed guide to developments in this field during the past two years. In addition to charts and illustrations pertaining to the product's composition and application, the publication provides interesting material on the scope of mining, manufacturing, and research activities involved, as well as helpful data on sales and service facilities available. *Titanium Pigment Corp., division of National Lead Co., 111 Broadway, New York 6, N. Y.*

Spray mask finishing—High production methods as applied to decorative finishing of plastics, metal stampings, and die castings are considered in this six-page folder. Information required for adapting this finishing technique to various products, as well as a complete description of the five types of fitted masks commonly employed, are also provided. *Thierica Studio, 409 Henry Ave., S.E., Grand Rapids, Mich.*

Chemical construction materials, Bull. MCC No. 1—A brief review of the firm's complete line of chemical construction materials is presented, including corrosion-proof linings, cements, brick sheathings, floors, protective coatings, and acid-proof brick and tile. *The Atlas Mineral Products Co., 42 Walnut St., Mertztown, Pa.*

Production of

FOR the purpose of this report, production is the sum of the quantities of materials produced for consumption in the producing plant, for transfer to other plants

Materials	*Total prod'n first 4 mos. 1950*	*Total sales first 4 mos. 1950*
CELLULOSE PLASTIC:[a]		
Cellulose acetate and mixed ester plastics:		
Sheets, continuous:		
Under 0.003 gage	3,702,798	3,543,184
0.003 gage and over	2,671,150	2,692,083
All other sheets, rods, and tubes	1,466,560	1,163,216
Molding and extrusion materials	23,492,515	22,563,074
Nitrocellulose		
Sheets	1,908,483	1,873,983
Rods and tubes	620,852	337,003
Other cellulose plastics[b]	4,116,429	4,143,423
PHENOLIC AND OTHER TAR ACID RESINS:		
Laminating	20,750,749	13,531,087
Adhesives	9,445,075	8,607,945
Molding materials[a]	69,494,899	57,165,791
Protective coatings (containing less than 10% modifier)	6,544,716	5,279,460
Miscellaneous uses (covers casting)	17,941,925	18,509,842
UREA AND MELAMINE RESINS:		
Adhesives	21,171,735	19,238,901
Textile- and paper-treating resins	9,218,914	7,412,704
Protective coatings, modified and unmodified	8,244,780	7,167,505
Miscellaneous uses, including laminating and molding[c]	19,175,817	17,368,961
STYRENE AND STYRENE DERIVATIVE POLYMER AND COPOLYMER RESINS:		
Molding materials[a]	76,157,433	79,703,165
Miscellaneous uses[d]	16,002,757	14,331,117
VINYL RESINS:		
Sheeting and film, including safety-glass sheeting[a]	73,590,252	62,807,920
Adhesive (resin content)	5,496,210	4,929,130
Textile- and paper-treating resins, including spreader and calendering types (resin content)[e]	14,641,305	13,323,278
Molding material (resin content)	36,485,538	33,940,693
Miscellaneous uses (resin content)[e]	7,876,408	4,502,324
MISCELLANEOUS SYNTHETIC PLASTICS AND RESIN MATERIALS:		
Molding materials[f]	17,098,061	17,030,389
Protective coatings[g]	21,230,682	20,735,269
All other uses[h]	64,408,729	62,875,492

[a] Include fillers, plasticizers, and extenders. [b] Includes sheets, rods, and tubes, and molding and extrusion materials. [c] Data on resins for laminating and miscellaneous uses are on a dry basis; data on molding materials are on the basis of total weight. [d] Excludes data on protective coating resins; these data are included with miscellaneous coating resins to avoid disclosure of

Plastics Materials

of the same company, and for sale. Sales include only the quantities involved in bona fide sales in which title passes to the purchaser.

March 1950		April 1950	
Production	*Sales*	*Production*	*Sales*
847,765	860,152	1,073,553	1,032,594
693,045	690,921	691,742	720,842
342,512	284,299	379,107	358,381
6,405,349	6,001,122	6,301,186	6,226,163
518,160	504,321	501,518	454,452
131,611	80,625	85,929	67,716
1,197,704	1,188,319	926,172	925,593
5,140,560	3,377,536	6,334,527	4,168,157
2,696,820[1]	2,492,240[1]	2,149,140	1,891,680
19,144,704	15,167,062	17,986,432	14,917,266
1,668,694	1,303,369[1]	1,857,122	1,596,529
5,352,038[1]	5,233,011[1]	4,407,814	4,723,043
6,683,169[1]	5,440,414[1]	4,862,588	4,397,833
1,917,606	1,335,668[1]	1,852,865	1,473,541
2,438,255	2,338,790	1,986,486	1,555,174
4,604,461[1]	4,846,597[1]	4,718,431	3,988,503
22,724,146	22,627,472	20,280,481	20,344,048
4,307,452	3,918,034	4,274,991	3,932,567
20,676,388	18,796,147	18,674,625	14,798,979
1,472,670	1,330,838	1,586,880	1,319,816
3,990,442[1]	3,771,088[1]	4,076,487	3,400,730
9,532,681	9,287,072	9,513,009	8,376,151
1,989,375	1,251,963	2,067,764	1,065,126
4,736,781	4,318,193	3,924,671	4,698,585
4,919,464	4,987,286	4,751,633	4,432,767
16,021,879[1]	16,298,828[1]	15,717,036	15,269,218

operations of individual companies. [e] Includes data for spreader and calendering type resins. [f] Includes data for acrylic, polyethylene, nylon, and others. [g] Includes data for coumarone-indene, petroleum, silicone, and other protective coating resins. [h] Includes data for acrylic, alkyd, coumarone-indene, nylon, petroleum, silicone, and others for miscellaneous uses. [1] Revised.

INTERNATIONAL PLASTICS NEWS*

Activities Around the World of Interest and Importance to the Plastics Industry in the United States

Packaging—Toilet goods manufacturers are now making increasing use of plastics for packaging. One of the newest lines of liquid shampoos utilizes plasticized p.v.c. in extruded form. The shampoo, Pears Gloria, is actually packaged in sachets or bags which are individually sealed from p.v.c. tubing, extruded by Melwood Thermoplastics Ltd.

Pipes—The Ministry of Health is to investigate the suitability of plastics to replace galvanized iron for small-diameter water pipes, especially in farm water service lines. Particular attention is to be given to the claims for extruded polyethylene tubing. Although industrial polyethylene tube is more expensive than galvanized iron in the smaller diameters, in bores of 1¼ and 1½ in. it is found to be considerably less expensive.

Styrene blocks—Under license from the U.S.A., British Moulded Plastics Ltd., Walthamstow Ave., London E.4., has started molding the Luma-Blok hollow styrene architectural block or brick. Production is temporarily restricted by limited supplies of styrene. The introduction of the block coincided with an exhibition at the new showroom of the U. K. distributor, W. H. Froy & Sons Ltd., Hammersmith, London, W.4. The showrooms used Luma-Bloks as the chief decorative theme in a display visited by hundreds of designers, display men, store buyers, and leading architects including architects for the 1951 Festival of Britain. Chief interest was in Luma-bloks for office partitioning and window and showroom displays.

Materials for export—Plastic materials are among the items which Britain has agreed to supply to Czechoslovakia in the second year (commencing July 1, 1950) of the 5-year Anglo-Czechoslovakia Trade Agreement. No breakdown is yet available of the types of plastics materials agreed upon by the negotiators, but British converters, fabricators, and molders are themselves restricted in output by the shortage of materials, and demands are reported to be reaching Britain from would-be importers of certain materials in Canada and U.S.A. Thus, British suppliers anticipate difficulties in meeting obligations under this part of the agreement. An official spokesman stated there was little likelihood of a government directive being issued to supply materials to Czechoslovakia at the expense of dollar markets.

Catalyst carriers—Sutcliffe, Speakman & Co., Ltd., Leigh, Lancashire, has announced the development of two types of activated charcoal which can be used as a catalyst carrier for mercuric chloride in connection with the production of vinyl resins.

Molding machines—Introduction of a new down-stroking oil-hydraulic press for compression and transfer molding was announced recently by B.I.P. Engineering, Ltd., B.I.P. Group, Aldridge Rd., Streetly, Staffs. The press, designed for the re-equipment and modernization of the thermosetting molding industry, is available in two basic models, Type 100 and Type 200, both of which cover a pressure range of from 50 to 300 tons.

Supply situation—The British plastics industry is enjoying a boom; home-market demand for luxury articles, motor car accessories, and electrical goods has increased appreciably during the last few months. Contrary to trade prophecies, the retention of the purchase tax has not brought about a trade recession. Noticeable export trend is the large increase in Canadian orders for electrical parts molded of phenolic and urea. As a result of this upward trend, most United Kingdom suppliers are finding difficulty in meeting current demands for both thermosetting and thermoplastic molding materials.

Imported butyrate—A good deal of interest is being shown by British molders in cellulose acetate butyrate imported from the U.S.A. at the rate of about 30 tons a month. So far, British manufacturers have not succeeded in producing this mixed ester, although it is reported that one of the largest firms in the business has spent considerable sums on development work. Cellulose acetate butyrate is used for applications where good dimensional stability is specified; one of the most ambitious injection moldings in this material is a radio cabinet made by Halex Ltd., on a 40-oz. H.P.M. machine.

Polyesters—A new, though belated interest in low pressure polyester resins is reported from the British aircraft industry. The famous de Havilland jet plane, The Comet, makes use of many different polyester parts in its construction, including thermal de-icing fairings, wing tips, radomes, and many internal shapes. A noticeable trend is that aircraft firms are setting up their own fabricating units instead of relying upon the facilities of outside contractors.

Bucket—A safety bucket molded of polyethylene and provided with a rigid vinyl handle is attracting a good deal of attention in the British chemical industry. The manufacturer is Chemical Pipe & Vessel Co. Ltd., Croydon. This bucket is designed so that the contents can easily be poured into small-necked vessels. The bucket is robust in construction and fitted with legs.

Rigid vinyl—Rigid or unplasticized polyvinyl chloride is finding many new industrial applications, in Great Britain. In the photographic business, white rigid p.v.c. developing trays are finding a ready market. Another interesting use for rigid p.v.c. is for pads used to protect cutting tools in the shoe, dressmaking, and tailoring trades and in the manufacture of tin foils, packages and printed matter.

*Reg. U. S. Pat. Office.

NEW MACHINERY AND EQUIPMENT

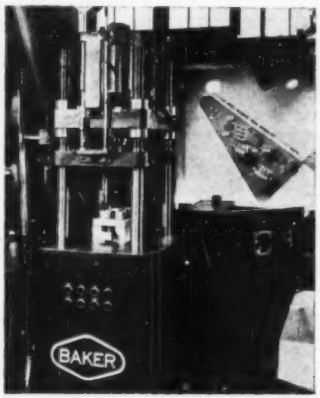
MODIFIED MILLING MACHINE—Machining hours required to produce dies, molds, experimental parts, and irregular-shaped pieces are said to be substantially reduced by an improved tracer-controlled milling machine manufactured by Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn. The modified unit, called Keller BL, incorporates a new design automatic tracer which, operating in conjunction with an automatic variable speed control, provides continuous variation of the individual machine motions (called for by the tracer) in proportion to the slope being followed. An automatic electric control enables tracer to glide smoothly over any contour.

New drive units for the vertical, horizontal, and transverse movements of the machine—with an increased range of travel speeds and step feeds—replace the old-style drive with their four-gear shifts. The new travel speeds are infinitely variable from 0.5 to 30 in. per min. Step feeds, previously of limited range, have been replaced with a single unit mounted in the control cabinet, giving a range of feed from 0.010 to 4 in. in increments of 0.010 inch. A wide range of spindle speeds are provided ranging from 80 to 3600 r.p.m.

Other advantages claimed include:

a power-limiting circuit which interrupts the travel motion when a pre-set cutter load is approached; the ability to automatically reverse either vertical or horizontal travel motion at the edge of an irregular form or cavity, thus eliminating non-cutting time; and a new design-control cabinet.

ALKYD PRESS—Greatly increased production rates are claimed for a new fully automatic, high-speed alkyd press recently introduced by



Baker Bros., Inc., 1000 Post St., Toledo, Ohio. Higher output is said to be attained through fast opening and closing speeds (about 400 in. per min.) and through automatic cycling of the machine. Only periodic loading of powder and removal of finished parts by the operator is required. The 15-ton press is a self-contained unit requiring only electrical connection and a 75- to 100-lb. air source.

Automatic feeders are standardized in 2-, 4-, 6-, and 8-cavity models. Feeders are actuated by integral air cylinders with the charge volume infinitely adjustable up to maximum capacity.

In operation, parts are ejected from the die by an air cylinder, with mechanical linkage for the top knockout pins. Cavities are then cleaned by an air blast, and fresh material is fed into the cavities in preparation for the next cycle.

PANEL ENGRAVER—Designed specifically for marking and engraving control panels and other large assemblies, a new photograph engraving instrument is produced by Green Instrument Co., 385 Putnam Ave., Cambridge, Mass. The new machine produces fine engraved letters, numbers, or designs on plastics, metal, or wood surfaces by merely tracing the master copy. Panels ⅜ in. thick by 19 in. wide by any length may be engraved. The new model is provided with a copy carrier supported above the machine base.

PELLETIZER—Designed specifically for use with continuous extruders is a new pelletizer recently announced by Cumberland Engineering Co., Inc., Box 216, Providence, R. I. Of particular interest to small users of plastics, the equipment is claimed to produce a superior molding compound of identical, uniform pellets. Feed rolls and their drive mechanisms are pivoted so that they may be swung out of operating position, permitting easy cleaning.

CUTTING BLOCKS—Longer life, cleaner and safer cuts, and quieter operation are major advantages claimed for a new cutting block made of Tygon, a tough formulation of vinyl plastic created by Colonial Rubber Co., a division of U. S. Stoneware Co., Ravenna, Ohio. Production costs can be reduced on clicking and mallet cutting operations by stopping rejects from double cutting due to "bounce backs," lessening the interval between die resharpening, and virtually eliminating die breakage. Materials such as plastics, rubber, leather, cork, fiber, felt, cloth, paper, foils, or light-gage metals can be cleanly die cut on this tough surface. There is no danger of getting foreign matter in stock, and stock of different colors can be cut without fear of cross contamination. Other highlights include self-healing and use on both sides. Standard stock sizes are 20 by 20 by ⅜ in., (weigh-

NEW! VAN DORN 2-ounce Injection Press

Utilizing the same rugged construction with doubled capacity, this Van Dorn press now offers you more profitable production with molding time reduced 30% to 50%. The new press has a larger heating cylinder with more plasticizing capacity; greater injection pressure; faster cycling due to larger motor and pump; and a unit for cooling hydraulic oil.

Surprisingly low in price, this versatile press uses inexpensive molds, can be set up by one man in 20 minutes, and operates 8 hours for under 1 dollar!

With all these features, this remarkable press is *unequalled* in the 2-ounce capacity class for molding practically all thermoplastics, including nylon.

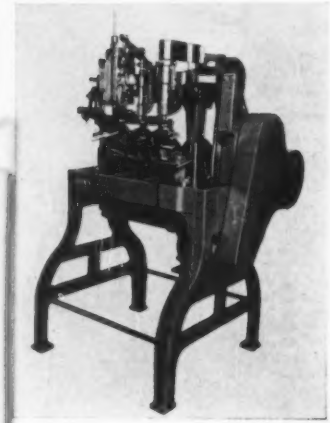
We make Mold Bases for Van Dorn Presses.

***Free* BULLETIN**
contains complete data
. . . Write for it NOW!

THE Van Dorn IRON WORKS CO.
2687 EAST 79th STREET • CLEVELAND 4, OHIO

ing 7 lb.), and 18 by 36 by ¾ in. (weighing 22½ pounds).

BRUSH MAKER—Three important advantages are claimed for the Model No. 11 Automatic Brush Making Machine produced by Carlson Tool and Machine Co., P.O. Box 321, Geneva, Ill. The unit can be used in the manufacture of a wide variety of brushes ranging from small tooth brushes to large plater brushes; is



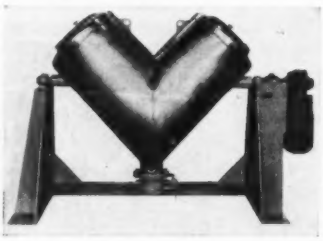
applicable to many different brush shapes from flat to wide flare; and operates automatically in drilling, filling, and stapling at rates ranging from 200 to 340 holes and tufts per minute. Precision is provided by a patented hole-finder guide which automatically and accurately locates holes drilled in the first station and holes to be filled and stapled in the second station.

The hole-finder set-ups are either a flat table mechanism for flat-type brushes where holes are positioned all in the same horizontal plane, or a gear-rack device for brushes that have a wide flare or a circular cross section. Also available is Model 11-D which is built with a dual-material magazine.

IMPROVED INJECTION MOLDER—Major improvements in its Model 10J-60-oz. Plastic Injection Molding Machine have been announced by Reed-Prentice Corp., Worcester 4, Mass. Principal changes which contribute to the unit's greater molding capacity include: mold opening increased from 24 to 36 in.; mold locking device which provides 1000 tons clamping pressure; casting area rated at 350 sq. in., compared with 210 sq. in. previously specified; a newly designed timing panel which automatically controls the die plate and plunger; convenient push buttons to control mold adjustment and heating cylinder adjustment; and a large-capacity heating cylinder, housing a copper core spreader, which assures rapid plasticizing at a speed of 250 lb. per hour.

PROCESS-TIMER—An automatic process timer, the "Cycl-Flex," has been developed by Eagle Signal Corp., Moline, Ill. The new unit is designed with auxiliary contacts operated by the clutch solenoid. These contacts, plus those operated after the time delay, provide four different load-circuit combinations, eliminating relays in many applications. The Cycl-Flex mounts in a 3$^{5}/_{16}$ in.-diameter hole for flush mounting in control panels of electronic heating equipment and molding, photographic printing, chemical processing, and similar machinery. A 9-in. time scale is provided. The instrument is rated at 10 amp. and 110 v., and is available for 60-, 50-, and 25-cycle frequencies of 110 and 200 volts. Time scales may be had from 0-30 sec. to 0-10 hours.

TWIN-SHELL BLENDER—Dual-chamber blenders which will rapidly mix and thoroughly blend dry materials of varying particle size, shape, or density are being distributed in several models by The Patterson-Kelley Co., E. Stroudsburg, Pa. The units employ a new mixing principle involving a combined tumbling or rolling action with a simultaneous transverse movement within the entire mass of material. In addition, a folding action is caused by the combining and dividing of the mass as the blender rotates. As



a result of the equipment's design, delicate crystal shapes will not break down during the mixing action, nor will heat be generated within the material. Since the blender does not require rapid rotation and involves fewer revolutions to produce a homogeneous blend, power consumption is reduced. Shell interiors are free of obstructions which might hinder cleaning.

Construction highlights include cast aluminum bases, stainless steel shells, neoprene-faced discharge valves, and integral gearhead-type motors. A laboratory model with acrylic shells is also available. Working capacities of the DD model range from 1 to 20 cu. ft. with operating speeds of from 25 to 18 r.p.m., while the GD unit has capacities from 30 to 250 cu. ft., and speeds from 15 to 6 r.p.m.

ACCELERATED THERMOCOUPLES—Recent design modifications have resulted in a new thermocouple having speed responses up to nine times that of previous models, it has been disclosed by the Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Wayne & Roberts Aves., Philadelphia 44, Pa. Factors contributing to the improved performance are: the mass of hot junction is considerably reduced in the 8-, 14-, and 20-gage types; the thermocouple wire is shaped to form a loop close to the hot junction; the insulator is faced about 1 in. from the welded tip, reducing conduction from the cold end; and the dimensions of the loop permit it to fit into a well, furnishing metal-to-metal contact and eliminating dead air space.

HEAT SEALER, CUTTER—Latest in the line of heat-sealing and cutting tools manufactured by Sta-Warm Electric Co., Ravenna, Ohio, is the 722 series. Among the principal advantages of the new design is provision for replacing the heating element in the user's shop. Oxidation of metal parts has also been reduced to a minimum. The cutting roll is Monel, as is the high-temperature sealing roller. The low-temperature sealing roller is bronze. Ventilating ports insulate the handle from the heating element.

Selective temperature control is

(*Continued on p. 125*)

BRILLIANT - BRIGHT - BREEZY

Colors!

for QUICK, EASY-COLORING CRYSTAL STYRENE *with* GERING'S

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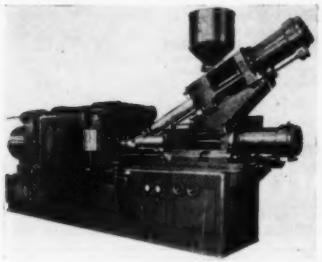
Our technical service department will be happy to make recommendations.

GERING
Products Inc.

afforded by a 150-step rheostat, giving a temperature range that is suitable for cutting and sealing of most plastics which lend themselves to such treatment.

LARGEST INJECTION MACHINE—Continuing progress in the production of large injection-molded pieces has been given new impetus by the recent introduction of a 200-oz. injection machine. Said to be the world's largest commercial machine, the equipment was developed by Watson-Stillman Co., Roselle, N. J. The first commercial installation was made at the Grenloch, N. J. plant of A. L. Hyde.

Watson-Stillman's new giant weighs 115,000 lb. and is operated



by a 60-H.P. motor. It is 24 ft. 8 in. in overall length, 5 ft. wide, and 12 ft. 11 in. high. Other specifications include: nozzle pressure, 21,000 p.s.i.; platen size 60 by 40 in.; hopper capacity, 300 lb.; clamping capacity, 1000 tons; and a daylight opening of 54 inches. Among the machine's applications are the molding of large radio and television cabinets.

ELECTRONIC RECORDER—Simple transfer from one magnification ratio to another without gear changes is the principal advantage of a new electronic recorder introduced by Tinius Olsen Testing Machine Co., 1068 Easton Rd., Willow Grove, Pa. A single multi-position switch selects magnification of strain from 1000:1, 500:1, 250:1, 100:1, 50:1, 20:1, and 10:1. Values of test data are unaffected by a change in magnification. The load scale is spread over 182 in. for each range. The new unit may be used with either an extensometer or compressometer for recording tension, compression, and transverse test data.

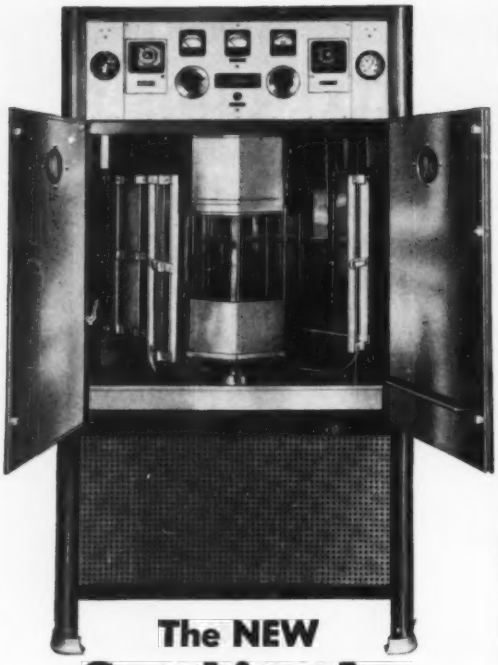
Improved Jar Cap

GREATER protection is afforded cosmetics, chemicals, and some food products by an improved jar closure which combines metal and plastic materials. By providing a more efficient seal, the new cap is said to prevent evaporation or vapor transmission, which eliminates loss of moisture, flavor, and bouquet.

Known as the Polyseal, the new product consists of a tin outer shell, and a molded polyethylene inner shell which carries the threads. Formold Plastics, Inc., Chicago, Ill., molds the plastic inner shells for General Cap & Closure Div., Jaques Mfg. Co., also of Chicago. For its first commercial use, the closure is being adapted by Walgreen Co., Chicago drug chain, to a brand of cream deodorant.

The tin outer shell, crimped around the edge to anchor the plastic insert in place, provides the necessary mechanical strength for a rigid, virtually unbreakable closure, while the resilient polyethylene inner shell eliminates the possibility of contamination. The braking action of the plastic against the metal permits the application of high torque pressures—yet the cap is easily unscrewed. In addition, an effective reseal is obtained. Finally the flexibility of the molded threads compensates for irregularities in jar threads. Polyethylene's translucency provides legibility for printed matter on the inside of the metal shell. The closure is produced only in the 58-mm. size.

Polyethylene inner cap, held by tin outer shell, prevents contamination



The NEW

Sunshine Arc Weather-Ometer

Type XW

A modernized and redesigned version of the open flame X-1 and X-1-A Weathering Units

Many of the control features that have proven their dependability in the Atlas Twin Arc Weather-Ometer have been combined with some features of the original X-1-A weathering unit to make a new Weather-Ometer of advanced design.

In the Type XW a new means of maintaining constant temperature is provided. Far more accurate temperature control is now available.

Radiation is from a Sunshine Carbon Arc which is of the motor-driven, open-flame type. Natural sunlight or intensified ultra-violet radiation is available depending upon the type of carbons and filters used. The light source has been improved to provide 16 hours of continuous operation as well as a number of other added conveniences.

All instruments are located on a convenient control panel, including an arc voltage setting switch and meter, cycle control of light and water spray, 1 to 24 hour shut-down time switch, thermo-regulator and running time meter.

Type XW is fully automatic and may safely be left in unattended operation overnight. If deionized water is to be used, aluminum spray piping can be furnished. The capacity of the stainless steel lined testing chamber is 54 panels. The machine is sturdily constructed and is shipped assembled, ready for connection.

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Two huge acrylic sheets form a sandwich into which the world's largest color transparency is fitted. Display measures 18 ft. high and 60 ft. long

Giant Color Transparency

IMPROVED techniques in the handling of large sheets of acrylics contributed largely to the design and erection of the world's biggest color photo transparency—the Kodak Colorama. Measuring 18 ft. high and 60 ft. long, the giant display has been installed by Eastman Kodak Co. on a balcony of New York's Grand Central Terminal.

Two huge acrylic sheets fabricated by Steiner Plastics Mfg. Co., Long Island City, N. Y., form a sandwich into which the transparency is fitted. When the transparencies are changed (at two- or three-week intervals) the sandwich is opened, permitting an electric lift to travel between the plastic sheets with a 20-ft. film spool on which the transparency is wound.

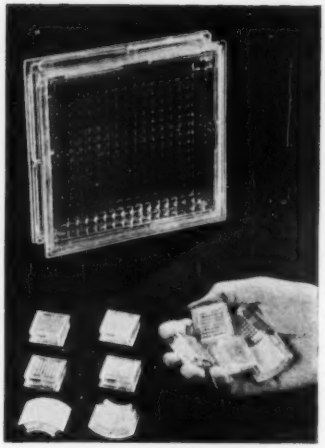
The rear, or diffusion sheet of acrylic was produced from white translucent Plexiglas measuring 60 by 102 by $\frac{3}{16}$ inches. Transparent Plexiglas of the same dimensions was used for the front sheet. Since the over-all size of the finished sheet sections is 5 by 19½ ft., two full sheets and part of a third were fabricated and bonded together in order to produce each section.

Both the transparent and translucent sheets were butt joined with a modified "V" groove. Each section to be bonded was soaked in a special solvent for acrylic and then bonded together under pressure. After the solvent in the joints had completely evaporated, the surface areas adjacent to the bonds were scraped smooth and polished.

Rear sheets are bolted together and supported from the top only. They are held in a slightly inclined position to insure that the back will be able to expand and contract with temperature changes. The front sheet is also held at the top only, but each section must be movable to permit changing the film. In order to eliminate reflection from the thousands of lights in the terminal, the front-surfaces of the transparent sections were lightly sanded with 180-grit sandpaper. Because the abraded surface is only $\frac{3}{16}$ in. from the color film, no indication of the sanding operation is visible. Also, because the 5-ft. wide sections of the transparent front sheet are butted accurately together, there is little if any indication of separation between them.

The color transparency is suspended from grommets in an edging strip and held in position by strategically placed spring anchors.

A solid bank of cold-cathode tubes, spaced 2½ in. on centers, illuminates the display. They total 5328 ft. in length, use 61,000 watts.



All features of styrene block are incorporated in miniature samples

Miniature Blocks

SAMPLES left with a prospective buyer become powerful selling aids for salesmen. This is but one of several reasons why Columbia Protektosite Co., Inc., Carlstadt, N. J., developed a group of miniature blocks designed along the same lines as the firm's decorative styrene partition blocks.

The miniatures, also of styrene, incorporate all the features of the full-size block, which is called Luma-Blok. Each unit has three separate molded parts—two covers and a center section—which are cemented together.

Among the other considerations prompting the creation of these small-scale samples is the fact that the miniatures, measuring only 1¼ by 1¼ by ½ in., are easily packed and carried in sample cases. Moreover, the small units permit the salesman to display the product's color range and mechanical features to maximum advantage.

Luma-Bloks are available in translucent crystal, pink, blue, and amber. A major feature, which is easily demonstrated through use of the miniatures, is the patented interlocking fin molded on opposite sides of the block's center line. Columbia's miniatures are also being produced in curved shapes to illustrate the latest addition to the firm's line.

Sweeper Bristles

SYNTHETIC fiber bristles that can stand the abuse of being used in rotary-type powered street-cleaning equipment are being produced by Modglin Co., Inc., Los Angeles, Calif. The bristles are being marketed under the trade name of Permene, a name also applied by Modglin to styrene bristles used in whisk and other brooms for various household uses.

Tests of the heavy-duty bristles conducted by various municipalities are reported to show that Permene has a life expectancy many times that of bassine, palmyra, split bamboo, hickory, or other natural fibers generally used in street-cleaning machinery.

Additional qualities claimed by the manufacturer for the synthetic bristles include: greater ease in manipulation, since the water and steam baths necessary with vegetable fiber bristles are eliminated; imperviousness to water; lower labor costs in broom rewinding; and more efficient sweeping and cleaning performance.

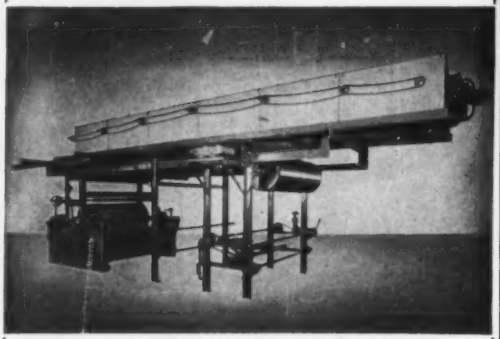
Modglin's Permene bristles are manufactured in lengths up to 26 inches. Although the initial cost of synthetic fiber bristles is higher than that of natural-fiber products, Permene's longer life potential more than compensates for this disadvantage over a period of time.

Synthetic bristles in broom have longer life than natural fibers

TWO COLOR LEMBO

vinyl printing machine

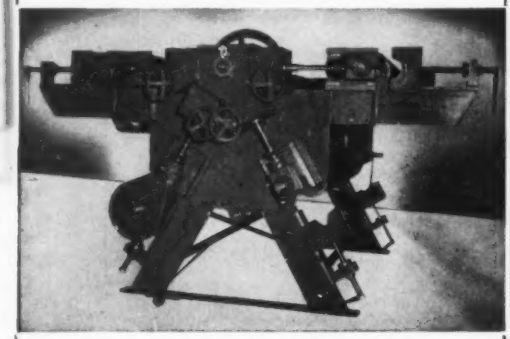
- For vinyl and other plastic films
- Available in one to four color models, too
- Fully adjustable—accurate register
- Widths up to 120"
- Repeats pattern from 14" to 72" and larger upon request
- Rigid steel frame construction



FOUR COLOR LEMBO

printing machine for vinyl and polyethylene films

- Handwheel or motor controlled register units assuring accurate register at all speeds
- No exposed gearing
- Repeats in patterns from 14" to 72" and larger upon request



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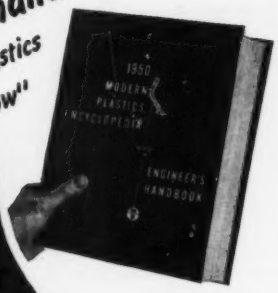

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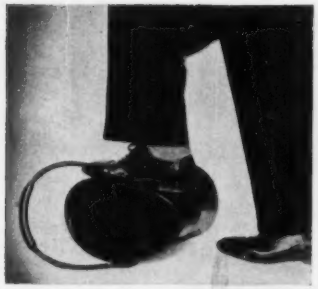


High-styrene copolymer rubber pail is light in weight, but strong. Molded-in spout keeps corrosive chemicals from running down sides

Chemical Pail

DURABILITY and resistance to almost all corrosive solutions are the major advantages of a pail manufactured by the American Hard Rubber Co., New York, N. Y. The pail, for use in the chemical industry, has a capacity of three gallons and is made of a new, tough, resilient, high-styrene copolymer rubber called Ace-Hide that combines light weight with strength.

To insure safer handling of chemicals, the pail has a spout that can pour easily directed streams into narrow-necked vessels. The spout is designed to reduce drip and prevent corrosive materials from running down the side of the pail. The rim permits the use of a close-fitting, splash-proof cover. Both the rim and the bottom of the pail are reinforced for extra strength. A handle, made of another high-styrene copolymer rubber called Riji-Tuf, is shaped to fit the hand. An easy-to-read scale on the inside is marked off in graduations of half-gallons.

Shade cutter has butyrate grip and cover. Marker is of same material

Shade Cutter

TO provide retail-store employees as well as consumers with a convenient device for cutting down window shades to desired lengths, Clopay Corp., Cincinnati, Ohio, has developed a window shade cutter largely made of Tenite II cellulose acetate butyrate. The new tool is about the size and weight of a flashlight. It cuts to measure with speed and accuracy, is safe to use, and is reported to stimulate sales at shade counters. Considerable saving in counter and shelf space is also claimed for the new unit.

The plastic grip and blade housing are molded by Adams Plastic Products, Cincinnati, Ohio. Dies, which were produced by Mt. Healthy Engineering Co., were made so that both halves of the handle and cover are molded in one shot. Molding is accomplished on a 4-oz. machine.

Plastic was chosen because it offered the most inexpensive way of producing the desired shapes; provided a safe protective sheath for the knife; added attractiveness to the design; and gave the tool a comfortable feeling when used.

Accompanying the cutter is a measuring unit, also of Tenite II, which permits clerks to cut shades accurately to any of the three widths normally required. The marker comes equipped with a 54-in. steel rule and screws for fastening it to a counter. A carry-home carton provides the cutter with added sales appeal.

Polyethylene clamps for electric cables reduce corrosive action

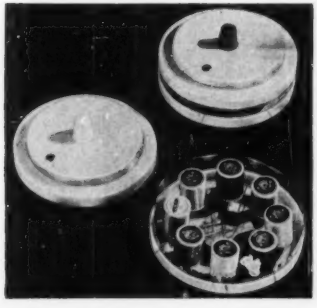
Cable Clamp

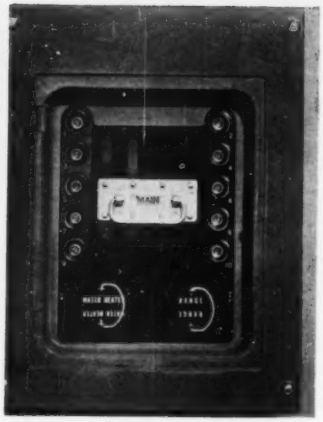
DURABILITY and non-conductivity are major advantages claimed for a fire-safe fastener clamp for electric cables manufactured by Commercial Plastics Co., Chicago, Ill. Previously made from metal, the clamps are now molded of polyethylene to reduce corrosive action. The fastener, called the CPC Non-Corrosive Strap, is available with a flat opening for double-cable duty or a round opening for triple-wire cable.

Thread Caddy

FOR use as a premium or an ad specialty item—and of appeal to gadget-minded women—is a thread caddy manufactured by The Emeloid Co., Inc., Hillside 5, N. J. Molded in three pieces of ivory styrene, the caddy has eight molded-in pillars to hold spools of thread which are clearly seen through a cylindrical acetate sheet window. Adjacent to each spool is a slot in the transparent side through which the thread can be pulled. Pins and needles are held in a cork which is bonded to the center.

Thread can be identified through acetate window of styrene holder





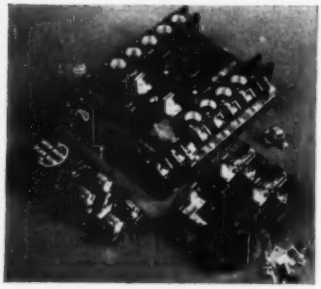
Over 5 lb. of phenolic are in 100-amp. main-and-range pull switch

Switch Base

WHAT is claimed to be the largest molded phenolic base ever used in a main-and-range pull switch is incorporated in the new Noark 100-amp. unit made by Federal Electric Products Co., Newark, N. J. The switch is designed to meet the demand for increased loads required by residential buildings.

The base measures 11¼ by 9 by 3½ in. and weighs in excess of 3 pounds. It is one of several parts, all molded of Durez phenolic, used in the complete assembly. Design of the mold for producing the base was complicated by the fact that nearly 100 holes and slots, a dozen wall sections of varying thicknesses, and numerous bosses and recesses are molded-in. The phenolic parts in each switch total over 5 pounds.

Production of phenolic switch base required intricate mold design

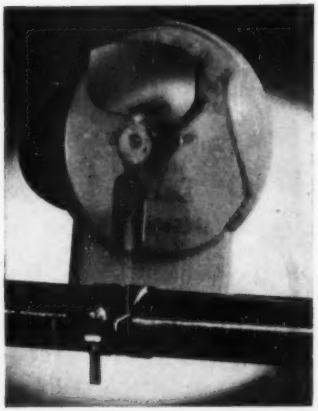


Styrene speedometer with molded-in numbers run by air velocity

Speedometer

ADAPTABLE to bicycles, motorbikes, scooters, and tricycles, an air-operated speedometer called Air Flight is being manufactured by Knickerbocker Plastic Co., New York, N. Y. The frame is molded in one piece of Lustrex styrene, with a mileage scale molded-in on the face. A shaped metal vane, facing the direction of travel, tends to turn as a result of the air velocity created by the vehicle's motion. A styrene pointer, mounted on the same shaft as the vane, turns with it and indicates air speed on the scale. Speedometer will register up to 50 m.p.h.

When air moves metal vane, speed registers on the speedometer face



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Eye-Catchers

PROMOTIONAL ingenuity, limited only by the imagination of the copy-writer, can make effective use of a line of small molded styrene items being produced and marketed by Hewig Co., New York, N. Y. Designed to be attached to promotion pieces, letterheads, and personal correspondence, the eye-catching items, called "Attention Getters," are offered in 30 stock forms including a pipe, arrow, mail box, scissors, telephone clock, and different tools, in addition to the letters of the alphabet. Each shape is about 1 in. high, and all are available in a wide assortment of colors. Other forms can be made up on request to fit individual needs.

Made of styrene supplied by Monsanto Chemical Co., the plastic items are injection molded on 1-oz. machines; the number of cavities in each mold varies depending on the size of the piece. They are attached to the promotion piece or letterhead by moistening with carbon tetrachloride or by the use of rubber cement. Because of their light weight, no additional postage is required on the average mailing piece.

Although the pieces can be used alone, or in conjunction with established firm slogans, the manufacturer has suggested some effective ways of handling the items. For example, a miniature telephone carries the caption, "Our new phone number is ....."; the ruler is accompanied by "Make it a rule to ....."

Styrene devices attached to promotion literature attract attention

Annealing

(*Continued from pp. 83-89*)

the tea-cups and feeding dishes. Unannealed tea-cups withstood immersion in kerosene without cracking; even so, annealing markedly improved their durability as measured by the thermal cycling test. Five minutes of annealing were sufficient to make the feeding dishes resistant to kerosene but longer annealing times added further to thermal shock resistance. These data indicate that the kerosene test alone is not sufficient to define the quality of injection moldings and that the cycling test is useful in evaluating the degree of improvement in durability attributable to annealing treatments.

Photographs of annealed and unannealed feeding dishes after thermal cycling are shown in Fig. 3, page 88. The radial cracking pattern of the unannealed specimen is typical of center-gated articles possessing strains from the molding operation. In contrast, the annealed dish shows only traces of crazing after 145 cycles.

Table II, page 86, summarizes our test data on a number of annealed styrene items. In every case the annealed specimens were far more resistant to thermal shock than the untreated ones. There is every reason to believe that the data give a reasonably good indication of performance in actual use and that the annealed specimens are enough better to warrant the use of annealing on a commercial scale.

Tests vs Service

Several styrene molders, faced with durability problems, have tried simple annealing techniques like that described above. Annealing conditions were worked out on the basis of kerosene testing and thermal cycling tests. As expected, improved performance of the items in terms of mechanical shock resistance, thermal shock resistance, and useful service life was obtained. It is particularly interesting that, with careful planning, the annealing step was included without employing extra labor or increasing production costs significantly. These molders have found, therefore, that annealing can often be justified on a realistic, performance-versus-cost basis.

It is natural to wonder whether the benefits of annealing can be achieved by proper control of conditions so as to produce an annealing effect in the mold. Hot dies and long molding cycles would be expected to help. Experience has shown that much can be done along this line and there can be little doubt that the injection-molding industry is putting more emphasis on close temperature control of molds. But molding cycles cannot be too long, for then the expense of molding becomes excessive. An injection-molding machine is too expensive to be used as an annealing apparatus. Therefore, the question becomes one of performance versus cost, or quality improvement versus length of molding cycle.

Tests for Annealing in the Mold

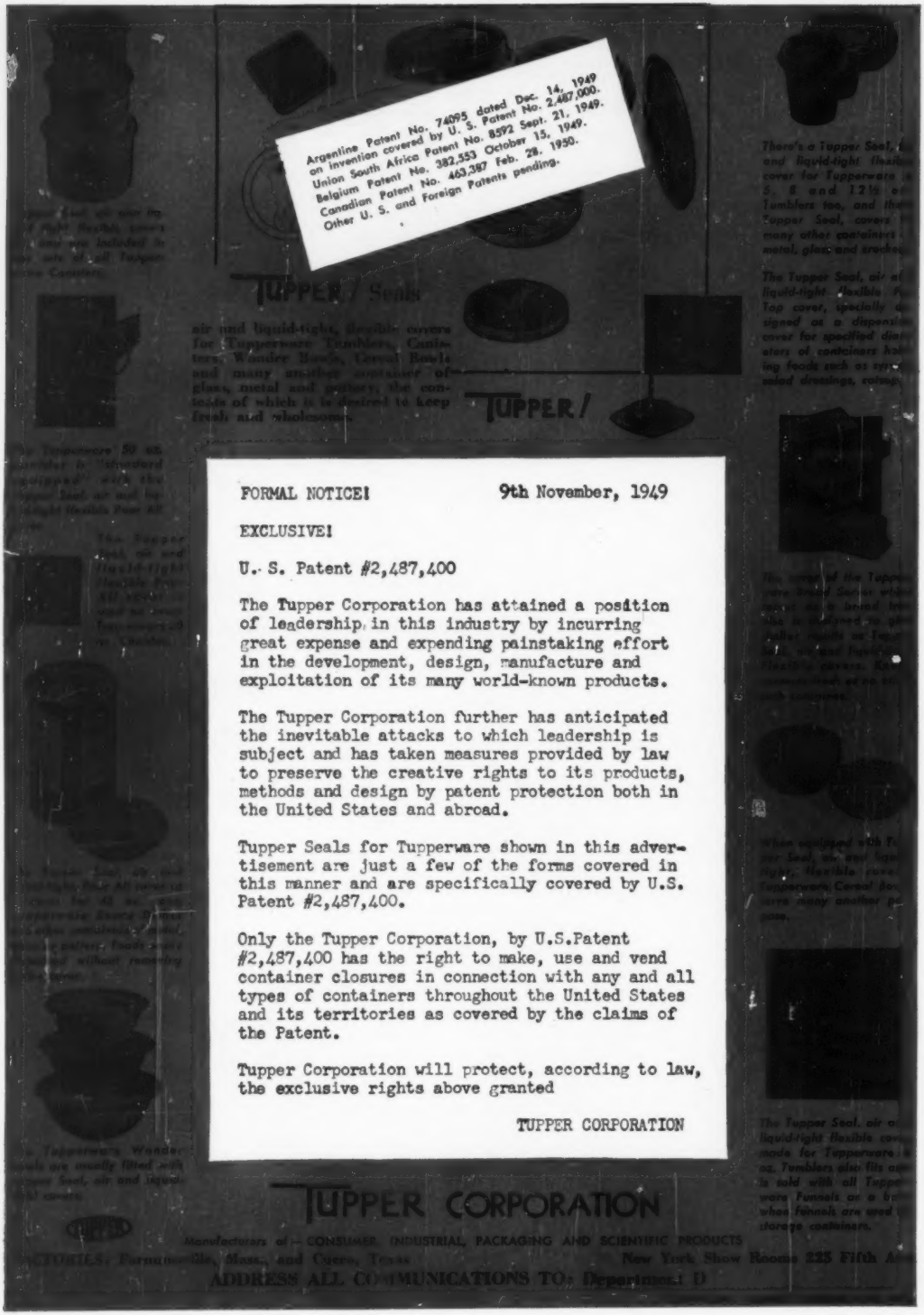
The baby feeding dishes mentioned previously were used to check this point briefly. Four sets of molding conditions were employed by the molder. All produced items of very satisfactory appearance, and the expected differences in mechanical strength and thermal shock resistance were obtained. Table III, page 88, presents the results in numerical form.

Better durability (as measured by the thermal cycling test) resulted from the higher die temperature and longer molding cycle but the improvement was small as compared to that obtained by a separate annealing operation (cf. Table II). Therefore, the molder decided to use the higher die temperature with the regular cycle and to employ a separate annealing operation to achieve maximum durability. Undoubtedly, there are many cases like this where highest quality can be obtained *only* by annealing or *less expensively* by annealing.

Summary

1. Simple and inexpensive annealing techniques often suffice to improve by several-fold the durability of injection-molded styrene pieces.

2. By means of accelerated tests, commercial molders can quickly determine optimum annealing conditions and can obtain an indication of the degree of improvement achieved.


Argentine Patent No. 74095 dated Dec. 14, 1949
on invention covered by U. S. Patent No. 2,487,000.
Union South Africa Patent No. 8592 Sept. 21, 1949.
Belgium Patent No. 482,553 October 15, 1949.
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S.P.I. Conference

(*Continued from p. 68*)

of these mistakes were still being made because furniture dealers—and even some furniture manufacturers—are not yet sufficiently informed about plastics.

The answer to the problem, said Mr. Brenner, is to stop overselling plastics as a wonder material, to educate the furniture manufacturers to use the vinyls correctly, and to adopt some method of labeling.

Plasticizers

"Plasticizers for Vinyl Film and Sheeting" was the subject of a paper by Dr. M. C. Reed, Bakelite Div., Union Carbide and Carbon Corp. Dr. Reed discussed the qualities required in good vinyl film and sheeting, the method of testing the various qualities, and the types of plasticizers which can be used to impart some of those qualities.

Growth of Film Production

Paul Terretta, The O'Sullivan Rubber Co., Inc., presided at the final session of the two-day conference. The first paper at this session was delivered by Howard S. Bunn, Bakelite Div., on the subject "Vinyl Film, Limited—Or Unlimited?" Mr. Bunn cited the growth of vinyl-film production to its present level of 80 million lb. (estimated production for 1949) and raised the question of whether the business is limited to present levels or unlimited in the sense that all the needs for the material have not yet been filled.

As factors favorable to the further growth of the vinyl film market, Mr. Bunn listed: vinyl film costs less than other materials required to do the same job; the steady improvement in quality; the installation of new and modern equipment which make possible far more uniform film; improvements in printing and design; improvements in sealing equipment so that fabricators can produce better end products; the introduction of new formulations to make possible new applications; and the use of embossing to improve quality and beauty.

On the other side of the balance, Mr. Bunn listed: the continued appearance on the market of inferior quality film; the use of too thin a film in certain applications; and the emphasis on price instead of on quality. This latter factor, Mr. Bunn pointed out, results in the relegation of vinyl film to the bargain basement instead of to the fabric or drapery department.

Informative Labeling

Elmer French, Firestone Plastics Co., spoke on "The Impact of Informative Labeling on Sound Merchandising." Mr. French, who is chairman of the S.P.I. Informative Labeling Committee, outlined the committee's plan for the establishment of voluntary industry standards as soon as work on test methods is completed.

Mr. French predicted that informative labeling will end the emphasis on price. "The consumer hasn't been given a fair chance to decide which of a number of competing products to choose, because the key product facts have not frequently enough been brought to the point-of-sale."

Mr. French traced the history of the S.P.I. Informative Labeling Committee and outlined its program.

Marketing Policy

The final paper of the meeting, "Gaining Respect Through Self Respect," was delivered by Sidney L. Chambers, Comprehensive Fabrics, Inc. Mr. Chambers explained the marketing policy pursued by his company as the national distributor of Koroseal for consumer goods.

The basis of the policy is to control the fabricating and merchandising of end products so that the consumer can buy any article bearing the Koroseal label with complete confidence. This is done by: using the material only where it does the job better and thereby makes a contribution to the industry; custom building compounds to fit end-use requirements; examining samples of the finished product to check workmanship and quality; observing sound merchandising practices and price policies; and not making exaggerated claims or misleading statements in advertising.

Mr. Chambers summarized the advantages which result from having a respected brand name and concluded with the remark: "A respected name is the best insurance against cut-throat competition."

Polyester Chair

(*Continued from p. 67*)

as called for by the Eames design. The edges of the shell are about 7/16 in. thick, while the wall section of the remainder of the piece varies from 1/8 to 3/16 inch.

Zenith solved the bead problem by adding a Fiberglas rope 3/16 in. thick to the preform as a reinforcement for the edge. This rope becomes fused with the rest of the preform during molding.

To handle production on this type of molding job, Zenith has built a new and separate dust-free building for molding parts involving preforms. The new preform room is ventilated by fans which suck in clean air through filters.

Four Colors

The Eames chair shells are produced by Zenith in four colors: gray beige, parchment, elephant hide, and blue-black. The shells are mounted on five different types of frames by Miller, thus making a total of 20 different versions of the chair. There are two models with chromium-plated legs, two with bases made of metal wiring, and a rocker version with wooden rockers and metal legs.

The metal legs of the various models are fastened to the underside of the shell by being screwed into inserts bonded in rubber shock pads which are glued to the underside of the shell.

Shape Chosen for Comfort

The shape of the shell was chosen after long studies of the human body, and the result is said to provide the maximum of body support and relaxation. The design of the shell is such that its graceful multiple curves catch highlights and cast shadows. Thus the chair appears to have a different silhouette each time it is viewed from a different angle.

The choice of a Fiberglas polyester combination for the material resulted in a chair shell which is light in weight, colorful, and long wearing. The surface of the plastic shell will not chip, peel, or fade. It is always warm to the touch, and the glass fibers give the shell a pleasing surface grain and design.

Acid Test

(*Continued from pp.* 91-98)

and patience unless the rest of the tank and the applicator are protected from the heat of the gun. Several primer systems for flame spraying have been suggested (89), but it is difficult to determine the advantages of such systems over those using compounded sheet. Polyethylene is inert to most alkalies, solvents, and acids except acetic acid at temperatures up to 60° C.

Polyisobutylene has been proposed for use as a coating and as a tank lining (80) using both solutions (22) and dispersions (110), but their use is limited because of the tendency of polyisobutylene to cold flow. Some success has been experienced with filled polyisobutylene and blends as well as with butyl rubber and styrene-isobutylene copolymers (33).

Copolymers of styrene with a small amount of butadiene are being used fairly extensively as coatings (22). These products have good chemical resistance and excellent adhesion to steel and concrete (54).

Miscellaneous — Polyurethanes (36) have been used as coatings in Germany and are being investigated in this country. Polymers of methacrylic acid esters, unlike the related esters of polyacrylic acid, have good chemical resistance, but their use has been limited to specialties. Silicones have been used for high temperature work (24), but much application research remains to be done. Polyvinyl ethers are said to have been used in Germany (126), but insufficient work has been done in the U. S. to show their merits.

Some melt- and solvent-protective coatings based on ethyl cellulose (85, 108) have been used for minor corrosion problems, but cellulosics are not usually considered as corrosion-resistant coatings (161). Nylon has good resistance to aqueous alkalies but is readily attacked by acids.

Specific Industrial Applications

The most widely used applications of corrosion-resistant materials of construction are in floors (103), chemical equipment (180), protective coatings (147), and tank linings (55). In spite of the large amount of Portland cement used in construction and the attempts to make it acid resistant (88), concrete is not satisfactory even for mild conditions of corrosion such as are found in food plants. The only satisfactory corrosion-resistant floor consists of an asphalt (28) or plastic base with acid-proof brick or tile joined by an acid-resistant cement (160). Some of the industries most cognizant of the need for corrosion-proof materials are heavy metals (142), chemical (157), petroleum (117), pulp and paper (182), textiles (160), plating (35, 77, 153), tanneries (152), oil and soap (45), dairies (114), food (165), breweries (74), water-sewerage works (162).

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(*Continued on p.* 150)

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Wood

(*Continued from p. 100*)

alcohol. A few aliphatic mercaptans also give the effect, in addition to sulfur, carbon bisulfide, and sodium hydrosulfide. The most effective compounds are as follows:

Inorganic and aliphatic sulfur compounds—Amyl mercaptan, isopropyl mercaptan, ethyl mercaptan (higher and tertiary mercaptans do not seem to produce the effect), sulfur (especially with controlled pH to about 6), carbon bisulfide (especially with controlled pH to about 6), and sodium hydrosulfide.

Aromatic sulfur compounds—Phenol sulfide, diphenyl sulfone, dipyridylethyl-sulfide, benzyl mercaptan, thio-naphthol, thiophenol, diphenyldisulfide, benzyldisulfide, benzyl sulfide, thiosalicyclic acid.

Aromatic nitrogen compounds—Thiodiphenylamine, acetyl diphenylamine, di-naphthyl-p-phenylenediamine, phenyl-β-napthylamine, di-phenylamine, and isopropoxy diphenyl-amine.

Aromatic oxygen compounds—Xanthone, dihydroxyanthraquinone, α,β-diphenoxyethane, hydroquinone dibenzylether, β,β-diphenoxydiethyl ether, β-naphthol, diamyl phenol, benzil, benzophenone, benzhydrol, p-hydroxydiphenyl, monobenzyl ether of hydroquinone, diphenylene oxide, and benzophenone.

It is noteworthy that phenol, aniline, catechol, etc., which according to previous investigations[8, 9] tended to produce improved plasticity in wood during simultaneous hydrolysis, did not compare very favorably with many of the other compounds tried in the present study. In the case of aniline the yield was high, indicating reaction or absorption on the wood, but improved plasticity was lacking.

Acknowledgment

The author acknowledges the valuable aid of Dr. John G. Meiler, under whose direction this work was carried out; also the assistance of M. B. Perry, R. D. Tripple and D. C. Baker, who were active in this investigation at various periods. He would like further to express his appreciation to the Plywood Research Foundation for permission to publish this information.

Table I—Properties of Wood After Aqueous Digestion With Chemicals

Chemical used	*pH*	*Yield*	*Flow*[a]	*Flexural strength*	*Water absorption*[b]	*Swelling in water*[b]	*Specific gravity*
		%	%	p.s.i.	%	%	
None	3.5	74.3	0	1410	38.4	12.7	1.01
Sodium hydroxide (2.5 g.)	5.9	76.1	0	1670	76.5	37.4	0.97
Sodium hydroxide (5.0 g.)	6.2	75.6	0	1190	61.2	23.5	0.95
Sodium hydroxide (7.5 g.)	7.4	69.9	0	2250	51.3	24.5	0.94
Phenol	4.7	75.6	20M	7230	15.0	5.6	1.19
Resorcinol	4.1	82.4	0	2100	44.5	16.3	0.99
m-Cresol	....	77.1	30D	7650	4.2	0.8	1.32
Aniline	4.3	90.0	0	1140	73.3	29.8	0.88
Isopropyl mercaptan	....	79.0	90D	4300	0.6	0.0	1.25
Sulfur and 5 g. sodium hydroxide	5.9	76.8	75D	11,650	1.7	0.8	1.37
Carbon bisulfide	4.5	78.5	70D	10,580	3.5	0.8	1.34
Carbon bisulfide and 3g. sodium hydroxide	6.3	84.4	100D	10,650	1.9	2.1	1.30
Thiophenol	4.3	83.0	100D	6050	1.0	0.0	1.30
Thiophenol and 5 g. sodium hydroxide	6.7	77.9	60D	9000	1.0	0.7	1.30
Diphenylsulfide	3.9	79.2	95D	5000	0.6	0.0	1.30
Phenyl-β-naphthylamine	4.4	81.4	75D	7750	0.7	0.0	1.24
Di-β-naphthyl-p-phenylene diamine	5.4	87.0	90D	7100	1.1	0.7	1.32
β-Naphthol	4.4	84.0	60D	5980	1.7	0.0	1.30
p-Hydroxydiphenyl	3.6	79.3	60D	5200	0.9	0.7	1.27
Benzyhydrol	4.5	80.8	60D	6900	0.6	0.0	1.28

[a] Number is percentage of surface which showed flow (M=medium; D=dark).
[b] Immersion for 24 hours.

THE PLASTISCOPE*

NEWS AND INTERPRETATIONS OF THE NEWS

By R. L. Van Boskirk

Benzol—Key to Plastics

Present shortages and future growth of the industry depend on the supply of this chemical kingpin

THE scarcity of benzol, chemical kingpin in the plastics industry, is again[1] contributing to a tight supply situation and a raise in the price of styrene molding materials; other plastics dependent on benzol are likely to feel similar pinches unless a summer slump, not unusual in the industry, permits an inventory build-up.

A look at the styrene sales figures —from 12 million to 15 million lb. a month in the early part of 1949 and from 17 million to 23 million lb. in 1950—shows the greatly increased demand for this thermoplastic. Sales of phenolics of all types, which also depend on benzol, showed an increase for the month of March of from 18 million lb. in 1949 to 28 million lb. in 1950. Synthetic GR-S rubber production is moving up from less than 30,000 tons a month in late 1949 to an estimated 35,000 tons in 1950—and synthetic rubber requires 1000 tons of styrene monomer (produced from a benzol-ethylene reaction) for every 4000 tons of rubber. It is estimated that nylon will require a minimum of 20 million gal. of benzol in 1950 as against 18 million gal. in 1949. And almost every other product which requires benzol as a base material will require more in 1950 than in 1949. Yet the amount of benzol now produced in this country is largely limited to the more or less inflexible amount that can be turned out by the steel companies' coking ovens.

This present scarce supply of benzol is a serious problem for the plastics industry. Nevertheless, the history of American industrial progress gives positive proof that incidents of this sort are not unusual. When the economics are right, similar situations have always been surmounted in the past. And the economics do not look too black in the current benzol situation.

Here is a report of what has been happening to benzol in the recent past:

Tight Since 1941—Benzol has been "tight" almost continuously since 1941. Somehow or other, users have generally obtained enough or nearly enough to meet their requirements, but except for occasional short periods, there has always been anxiety as to whether or not there would be enough.

The synthetic-rubber program, with its great demand for styrene, is held largely responsible for this situation, because GR-S is produced by copolymerizing styrene with butadiene. During the war there was very little styrene available for plastics, but today more styrene monomer is used for plastics than for rubber.

Not only styrene plastics but styrene-based polyesters, ion-exchange resins, and styrene-butadiene copolymers, widely used for shoe soles, floor covering and paint, are affected by the benzol shortage. Almost 50 million gal. of benzol were used for styrene in 1949. In addition, 29 million gal. were used for phenol and 18 million gal. for nylon. See Table I for a summary of these and other uses of benzol. Since nearly all the items listed in that table are expected to be in increased demand in 1950, it is estimated that in excess of 170 million gal. will be needed to fill the requirements.

Whence Benzol?—Benzol for chemical applications is obtained largely (about 80%) from coke-oven operations in 55 furnace plants operated by steel companies. The balance comes from "merchant-coke" plants where artificial gas is manufactured and coke is produced for sale. This latter supply is decreasing gradually because of the increasing tendency for municipalities to depend upon piped-in natural gas.

The steel strike in late 1949 cut off almost two months supply of benzol and practically eliminated all inventories. The shortage was not

Table I.—Estimates of Benzol Consumption by Uses (in 1000 gal.)

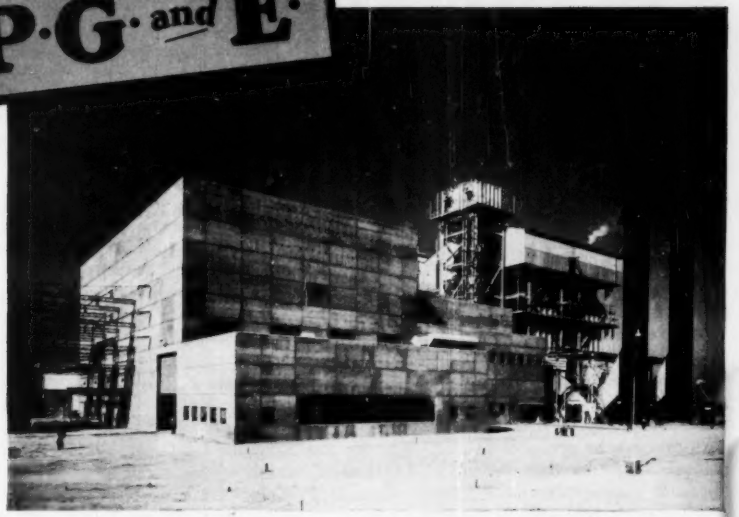
	Estimated Consumption		
	1948	*1949*	*1950*
Phenol	38,000	29,000	39,000
Styrene	50,000	50,000	58,000
Aniline	14,000	9,000	3,000
Nylon	18,000	18,000	20,000
DDT	1,000	2,000	3,000
Diphenyls	3,000	3,000	3,000
Maleic anhydride	2,000	1,000	3,000
Synthetic detergents	7,000	8,000	10,000
Dichlorobenzene	5,000	4,000	5,000
Monochlorobenzene (other than DDT, phenol and aniline)	5,000	3,000	5,000
Nitrobenzene (other than aniline)	4,000	3,000	4,000
Miscellaneous chemicals and solvents	15,000	10,000	12,000
Exports	1,000	1,000	1,000
TOTALS	163,000	141,000	168,000

Source: American Coke & Coal Chemicals Institute, December, 1949.

*Reg. U. S. Pat. Office

[1]See also "Is Plastics' Future Tied to Coal?," Modern Plastics 24, 89 (March 1947).

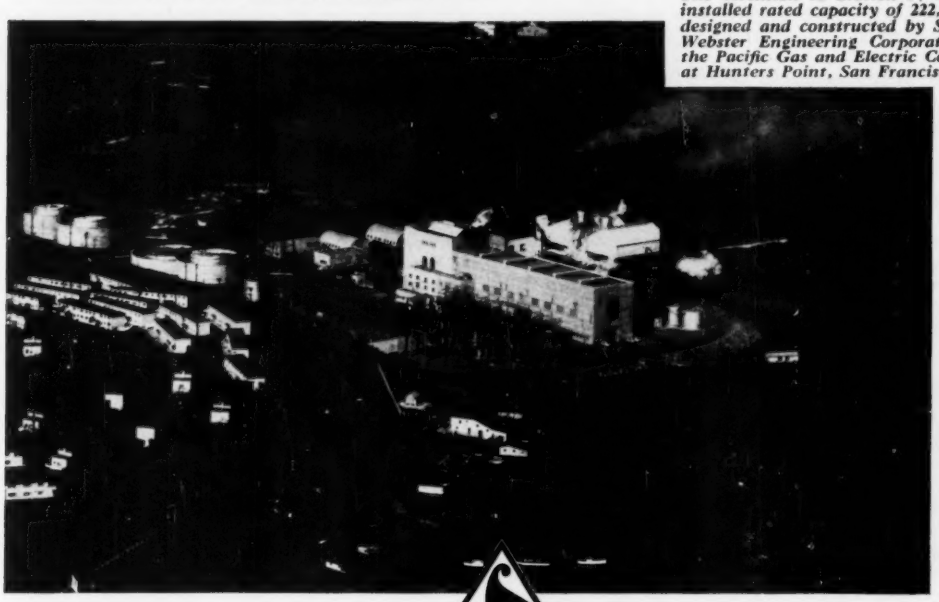
FOR P·G·and E·



The Kern Steam Plant and the extension to Station P of the Pacific Gas and Electric Company represent the finest examples in the country of centralized control in steam power stations.

The Kern Steam Plant, with an installed rated capacity of 175,000 kw, recently completed for the Pacific Gas and Electric Company in Kern County, about 300 miles south of San Francisco in the San Joaquin Valley.

The extension to Station P, with an installed rated capacity of 222,000 kw, designed and constructed by Stone & Webster Engineering Corporation for the Pacific Gas and Electric Company at Hunters Point, San Francisco.



STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

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vital at the time because of a decline in 1949 synthetic rubber production and a general low demand in mid-1949. In other words, there was enough benzol in storage to tide over the steel-strike period. The year's production of benzol (including motor benzol) was 140 million gal. in comparison to 160 million gal. of all types of benzol in 1948. Even though steel production may exceed all records in 1950, that would not necessarily mean a proportionate increase in benzol since there is a limit to the amount of coke that can be produced in steel-plant coking ovens. Any coke needed for steel making above the plants' oven capacity will come from beehive ovens which do not provide base from which benzol is distilled.

Then the Coal Strike—When the coal strike followed on the heels of the steel strike, benzol was again affected. Benzol inventories had been consumed to the last drop during the steel shut down, and when the coal shortage slowed down steel operations, benzol deliveries were cut to a minimum. Phenol and styrene producers were working on a hand-to-mouth basis with no chance to build up inventory. As a result, delays were unavoidable.

During this benzol crisis in early 1950, the demand for styrene, phenol, nylon, detergents, etc., piled up in ever-increasing quantity. On top of this, production of synthetic GR-S rubber went up to nearly 30,000 tons in May, 1950, with Government sights set on a 35,000-ton monthly figure for 1950.

Thus, if the Government succeeds in producing 400,000 tons of GR-S rubber in 1950, it will require 200 million lb. of styrene. During the same period, styrene plastics will require at least 240 million lb. of styrene monomer. Since approximately 250 gal. of benzol are required for a ton of styrene monomer, the combined 440 million lb. of styrene required for the just-above-named products would consume almost 55 million gal. of benzol. Other uses for benzol are estimated to require 114 million gal., giving a total for estimated 1950 requirements of 169 million gal.—more than the peak post-war production of 1948.

Styrene Production—As to the situation for styrene monomer production capacity, the President's report on the Rubber Program stated that enough facilities were available to produce 1 million tons of GR-S rubber. That would require 500 million lb. of styrene monomer. In March, the industry produced at a rate of over 480 million lb. of styrene and could probably go well over the 500 million-lb. figure for 1950—if benzol and ethylene were readily available.

The question therefore is: If the Government produces 400,000 tons of GR-S rubber in 1950, will there be enough benzol to meet increasing demands for styrene plastics, phenolics, nylon, detergents, dyes, etc., all of which are now showing upward production curves?

Where the Answer Lies—The answer hinges on from 15 million to 20 million gal. of benzol. If domestic producers come through with as much as 170 million gal. in 1950, the dependent industries would be able to squeeze through, but there is little likelihood of this.

The most promising additional source of benzol at the moment is that being imported from Europe in quantities reported at about 1 million gal. a month. If this supply can be kept coming, it will tide over the present emergency; in fact, it looks encouraging enough to permit some major users to say their benzol requirements for the remainder of the year are now in balance. However, the imported material is motor benzol and benzols of other qualities must be refined. The cost of refining—plus the tariff—will run the price up to considerably over the present 25¢ a lb. for coal tar benzol.

From Petroleum—Another source, but probably good for less than 10 million gal. during 1950, is petroleum benzol. Both The Dow Chemical Co. and Monsanto Chemical Co. are reported to have contracts with Shell Oil and Pan American Petroleum to provide petroleum benzol. The plastics industry is pinning its hopes on petroleum as a future big supplier. Benzol exists in both California and Texas crude oil, but the big question is when it can be produced in large quantity and at what price. Petroleum companies point out that petroleum benzol is not a by-product of their present commercial operations—as is benzol from coke ovens—and that huge investments in new facilities would be required to get into large-scale production. And, from their standpoint, it would have to be proved that benzol can compete with gasoline or fuel oil as a profit maker.

In National Defense—Benzol has been described as this country's number one industrial problem insofar as National Defense is concerned. Certainly rubber is vital to defense, and with the current threat to the natural rubber supply from Southeast Asia, it behooves America to take steps that will ensure a sufficient quantity of benzol to provide not only synthetic rubber but all the other important war-time products, including plastics, that are dependent upon this versatile chemical. It's a cinch bet that if war were declared, some petroleum companies would be in the benzol business at government behest just as soon as plants could be put into use.

As indicated above, cost has been a hold-back in the development of petroleum benzol facilities. Oil executives assert that a fair price would be in the neighborhood of 40¢ a gal. and they are fearful that the market would not support steady, large-scale production at that price. Plastics authorities say that such a price for benzol might raise the cost of styrene plastics 4 or 5¢ a lb., that phenolics might go up 2½¢ a lb. or more. However, large-scale production of petroleum benzol would eventually result in a lowered costs. In the meantime, the plastics materials derived therefrom could take the advance in price to meet a higher benzol cost and still maintain their position as relatively low-cost materials.

By Hydrogenation—Still another approach to a supply of benzol has been made by Union Carbide and Carbon Corp. by building a pilot

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plant for hydrogenation of coal and consequent production of coal chemicals thereform. However, any substantial results are probably still several years away, although the prospect is most promising for a long-term pull. Other methods for making synthetic fuel from coal are not at present thought to be fruitful for yielding benzol-type chemicals.

Rubber Politics—Another angle to the benzol situation involves international politics. The U. S. State Department would encourage large purchases of natural rubber because rubber is an important product of large volume that can in effect be traded for American-made goods. The U. S. Defense Department puts emphasis on synthetic rubber because natural rubber might become unavailable in war time.

The whole pot was boiling in early 1950, when the price of natural rubber in the United States rose from 16 to 34¢ a lb., in comparison to GR-S at 18½¢, then dropped to 28 cents. This variable difference between synthetic- and natural-rubber prices will always affect the amount of synthetic rubber used in the United States. Also, the situation is made more complicated by the constant purchase of natural rubber for stockpiling by various countries. This adds an artificial control that makes estimating of future needs a precarious venture. As a result any man who can accurately predict how much benzol is going to be needed for synthetic rubber in the immediate future would be so profound that he could settle world problems overnight.

Expanding Markets—But those who want benzol for plastics have a quite different outlook. They want it for an expanding market that is entirely outside the rubber tangle. They think they will need over 50 million gal. of benzol for styrene plastics alone this year and considerably more each year for an indefinite period. Their faith is so great that they are even talking about additional styrene monomer facilities—new polystyrene facilities are already on the way. They anticipate that the benzol source needed will be provided within the next few years and that there is no need to worry unduly about a limitation to future growth. Perhaps they take comfort from the fact that phenol users fretted some 25 years ago when only a few million lb. of natural phenol were available at a price of 30¢ a pound. Yet when synthetic phenol made from benzol became available, production increased to a point where 88.6% of the 205 million lb. of phenol used during the war was synthetic and the price was only 10¢ a pound!

Vinyl Dispersion Resin

ANNOUNCEMENT by the Bakelite Div., Union Carbide and Carbon Corp. that a new plant for the manufacture of VYNV.3, a new Vinylite dispersion resin, would be ready for production at South Charleston, W. Va., by mid-1951 gives further concrete evidence of the remarkable growth in the use of vinyl dispersions.

A dispersion resin is generally defined in the trade as one which can be suspended in a liquid. Plastisols and organosols are of this nature, a plastisol being a dispersion of resin in plasticizer and an organosol a dispersion of resin in plasticizer and diluent. The same-type resin is frequently used for both. Dispersion resins are also frequently called paste resins. Principal uses for dispersion resins so far have been fabric and paper coating, slush molding, and dip coating. In the July Plastiscope there was an article pertaining to their use for casting film and printing with a plastisol ink.

So popular have these resins become in the fabric-coating field that it is now estimated that over half of the coated fabric manufactured today is processed by the spread-coating method using dispersion resins. A considerable part of the spread-coated vinyl fabric has replaced the older type which uses nitrate coating. It is also presumed that the new resin will make inroads into the paper-coating field which has been dominated by solution-coating resin.

The advantage of the new Bakelite dispersion resin over its older resins sold for this purpose is that it can be dispersed more easily. In fact, it is practically a stir-in-resin with no other equipment than a pony mixer required for preparation. Formerly it was necessary to use a ball-mill or paint-mill mixer.

Ion Exchange Resins

AT a meeting held for the press to acquaint it with the latest advances made in ion exchange resins, Rohm & Haas Co., Philadelphia, Pa., pointed out that the new Monobed system of mixing anion and cation exchangers has proved particularly practical in that it requires smaller and potentially less costly equipment; is easier to operate; and is capable of more complete deionization than the two-bed system.

The principal application of ion exchange resins so far has been in the field of water purification. For example, the Los Angeles county water district in California has had marked success with its experimental use of ion exchange resins and will probably convert completely to this type resin in preference to the material presently used. When conversion is completed, it will require 2,500,000 lb. of resin. Although the initial cost is greater than the material now used, the end cost is less, because once ion exchange resins are installed, they can be re-used for over 20 years.

It is believed that many other municipalities will follow the example of Los Angeles when they learn of its success. There is another possibility with great potentialities in the use of ion exchangers to convert brackish water to potable water. Sea water is not included in this category—only brackish water containing 1000 to 10,000 ppm. of salt. The Hudson River between Yonkers and Beacon would fall in this range, as will also large semi-arid areas throughout the West and Southwest where well waters are actually dilute brine.

Ion exchange resins have also proved effective in beet sugar refining where they help to put more

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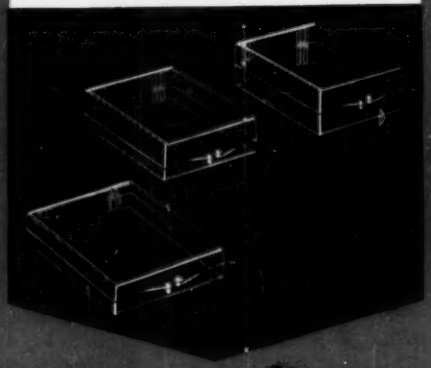

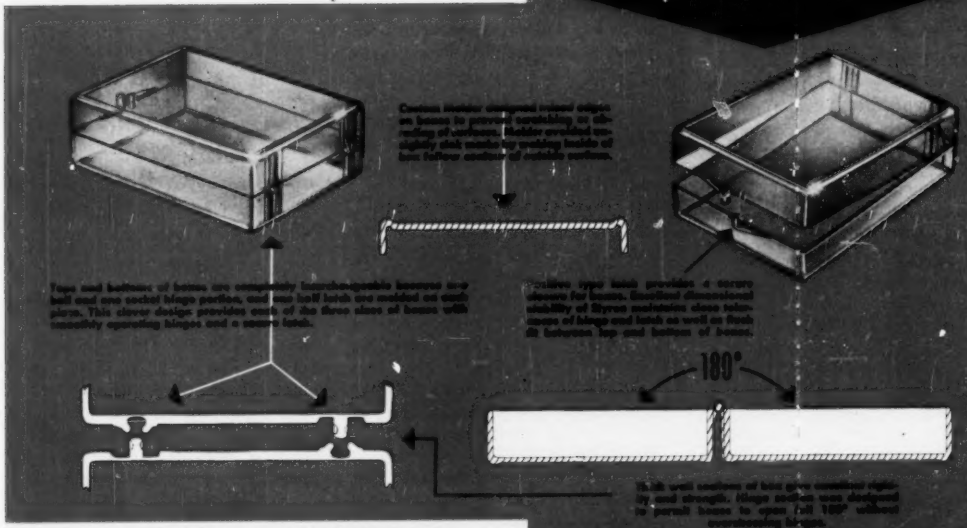

Utility boxes manufactured and distributed by the Hake Manufacturing Company, Inc., 440 Terrace Blvd., Depew, N. Y. (Patent pending).

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sugar in the bag and leave less molasses.

There are scores of other uses for ion exchange resins, but those named here are the most publicized at the moment. Ion exchange resins are generally styrene, but may also be phenolic- or amine-type resins. The cation resins, which are the only type required in water softening operations such as the Los Angeles operation described above, sell from 40 to 50¢ a lb.; the anion resins which are used with cations sell in the dollar per lb. range.

P.M.M.A. Now Part of M.C.A.

THE Plastic Materials Manufacturers Association, Inc., has been consolidated with the Manufacturing Chemists' Association, Inc. P.M.M.A.'s office in the Tower Building, Washington, D. C., will soon be moved to M.C.A.'s headquarters in the Woodward Building, also in Washington.

The consolidated associations will continue to coordinate activities of plastic materials manufacturers as done by P.M.M.A. in the past; in over-all industry problems, they will operate as a group within M.C.A. The former directors of P.M.M.A. will act as a steering committee for such plastic activities. F. H. Carman will continue to direct the plastics programs. M. F. Crass, Jr., association secretary, is in charge of the Washington office of M.C.A. The president is George Merck of Merck & Co., Inc.

Fabricator for Laminates

GENERAL Laminated Products, Inc., of Chicago, has purchased the laminating fabric division of General Electric Co. at Coshocton, Ohio, for a reported $250,000.

General Electric has thus withdrawn from the industrial laminating fabric business but will act as raw materials supplier to General Laminated, said Morris Perlman, president of General Laminated. General Electric's production of industrial laminates in the future will be limited to sheets, tubes, and rods. Its decorating laminated division, where surfacing materials and custom molded laminated products are produced at Coshocton, will continue as in the past.

Mr. Perlman has stated that the fabricating equipment purchased from General Electric will be divided between his company's Chicago and New York plants. The TV boom was "the factor" influencing the purchase, he said.

Saran in Packaging

SARAN film now seems definitely to be on the way toward widespread acceptance. The Dow Chemical Co. has been experimenting with this material ever since the war to overcome certain fabrication problems; the company believes it has successfully overcome the most difficult of these.

Up to date, the film has been used as a packaging material primarily for cheese and dried fruits. Because of the film's low gas transmission, lack of odor, and low moisture transmission, it has proved particularly satisfactory for this purpose.

A newer use is as a wrap for liver sausage. When saran casing is used, the meat can either be cooked in the casing or stuffed in after cooking. Ends are closed by tying or clip sealing. Here, again, low moisture and gas transmission are advantages in preserving freshness and flavor as well as preventing weight losses. More than 20 packers are now using saran for this end.

Other types of packaging such as liquid packs are already on the market, and nitrogen packs are going through the experimental stage. At last reports they are meeting all requirements.

One of the major problems confronting use of saran film for packaging in the past has been the difficulty of handling it on present packaging machines. One answer to this difficulty is a modified electronic-sealing bag machine which produces a neat, strong bag from printed film at a rate of from 40 to 60 bags a minute.

Another machine has been developed to use saran as an overall wrap. Previously saran has been difficult to push through a machine because of its extreme flexibility, but in this machine that difficulty is taken care of by a controlled jet of air which is blown across the space between the cutter knife and the conveyor.

Silicone Resins

TWO new silicone resins for electrical applications have been announced by General Electric Co., Schenectady 5, N. Y. One, designated silicone insulating resin 81132, is a flexible resin of good drying speed intended for use as a coating on glass cloth. It is reported to be tough, fast-drying without a cata-

Plywood Glues, 1949

Softwood plywood production for 1949 amounted to almost 2 billion sq. ft., 2% over the 1948 production, according to the Bureau of Census. The amount of glue classified according to various types used in this industry is listed in the accompanying table, as culled from the Bureau of Census figures. Figures for glue used in hardwood plywood are not available.

Glues Used in Softwood Plywood 1944-1949

Year	Total, all types	Casein	Soy bean	Phenolic resin	Other
	lb.				
1949	75,065,000	4,991,000	34,490,000	31,784,000	3,800,000
1948	79,586,000	4,953,000	30,285,000	40,053,000	4,295,000
1947	68,941,000	5,260,000	24,728,000	36,054,000	2,899,000
1946	55,970,000	5,488,000	23,817,000	24,743,000	1,922,000
1945	47,302,000	3,287,000	22,473,000	19,393,000	2,149,000
1944	55,941,000	1,953,000	27,879,000	23,067,000	3,060,000

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lyst, to have excellent build on glass cloth and a good heat life.

The other, silicone resin 81145, was designed for bonding and impregnating motors, generators, and transformers requiring Class H insulation. When properly cured, it is a relatively hard resin but maintains a high degree of flexibility. It will through-cure readily and will develop good bonding properties at elevated temperatures.

Wallboard Research

SPECIALIZED research, consultation, and engineering service on both hard and soft wallboards is now offered by the engineering firm of R. S. Aries & Associates, 400 Madison Ave., New York 17, N. Y. No particular process is favored by the organization, which will provide an impartial service to industry, recommending processes based on cost and product specifications, and conducting pilot plant tests.

The pilot plant can produce large samples of wallboards from many types of wastes, such as sawdust, shavings, bagasse, annual grasses, and agricultural residues.

Dr. Robert S. Aries who has been for the past decade the technical director of the Northeastern Wood Utilization Council heads the staff.

Saran Lining

SARAN lining for tank cars transporting hydrochloric acid is proving highly satisfactory, according to The Dow Chemical Co., producer of the material. For six months, two saran-lined tank cars have been in test use for transporting the acid; at the end of that time, saran showed no signs of attack.

Vinyl Adhesive

DEVELOPED particularly for the adherence of vinyl sheeting to porous surfaces, a new adhesive has been announced by Thomas W. Dunn Co., Pearl and Dover Sts., New York 7, N. Y. The new glue, called Vinyl-Hesive, is a water-thinnable emulsion-type resin that can be applied with conventional equipment or by brushing. In addition to its use for bonding vinyl film or sheet to paper, pressboard, and other porous surfaces, it is relatively non-toxic and may find wide application in food packaging.

Hardeners for Urea Glue

ADDITION of new hardeners to the company's present line of urea-formaldehyde resin glues has been announced by Synvar Corp., Wilmington, Del. The three hardeners, #182, #187, and #188, offered in liquid form, are designed for hot press work. They have a fast curing cycle at 240° F. or above, yet permit a long assembly time and give a long pot life to the resin mixture, according to company literature. All three hardeners work with straight as well as with extended resins.

Heat-Seal Label Paper

SPECIALLY designed for permanent adhesion to all types of cellophane, cellulose acetate, glass, and paper, a new instantaneous heat-seal label paper is being manufactured by Mid-States Gummed Paper Co., 2515 S. Damen Ave., Chicago 8, Ill. Called Promset 201, the material is reported to be polar-conditioned to retain adhesive qualities at temperatures down to —70° F., making it useful in labelling frozen foods and other refrigerated products.

Vinyl Head Masks

IMPROVED head masks by Curtis Crafts, Easton, Conn., were used by the actors in a float exhibited by the Bridgeport Brass Co. recently. The occasion was a celebration at the P. T. Barnum festival in Bridgeport, Conn. The masks or heads were sculptured by Virginia Austin Curtis of Curtis Crafts using a material called Sculptured Felt, a combination of felt foundation with padding and cotton stuffing. The unusual part of these masks was that they were impervious to weathering and, consequently, wouldn't "run" all over the wearer in the event of rain. The trick was to impregnate the entire surface with a modified vinyl resin which made the mask rigid on the outside and permitted decorating the surface with air brush and by hand.

Wet-Strength Paper Resin

LATEST addition to Hercules Powder Co.'s array of chemicals for the paper industry is a resin solution for producing wet-strength papers. Called Hercules Resin 138, the solution is said to assure excellent wet-strength; in addition it is claimed to improve dry-strength properties and act as an effective size additive.

Wire Insulation

VINYL insulating compound in improved form, produced from Geon resin and especially recommended for high-temperature service (105° C. maximum) has been produced by the Thermo Electric Co., Inc., Fairlawn, N. J. The new vinyl insulation, which withstands oils and most chemicals at high temperatures for longer periods than rubber, is used by Thermo Electric in connection with thermocouple lead wires.

Photo Film for Extreme Weather

TO meet U. S. Army Signal Corps specifications for a film that will retain adequate strength and flexibility at temperatures ranging from —65° to 140° F., the Armour Research Foundation of Illinois Institute of Technology has developed a film from n-propyl cellulose acetate. Able to withstand the extreme heat of the tropics and the cold of the Arctic, the cellulose derivative has the high molecular weight necessary to give the required physical properties.

Wall Tile Standards

COMMERCIAL standard CS 168-50 for styrene plastic wall tiles and adhesives for their application became effective on July 15, according to the Commodity Standards Div., National Bureau of Standards, Washington, D. C.

The new standard, preparation of which was instigated by S.P.I. over

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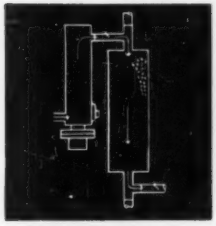
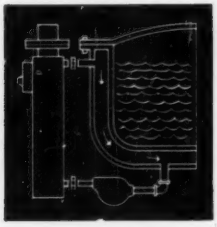


Heating Nitrogen to Reactivate Alumina



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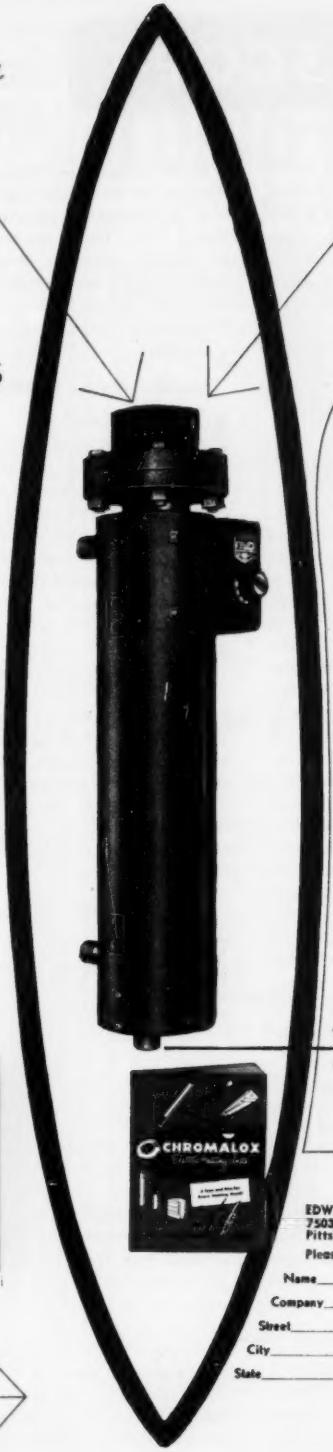

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two years ago, will be a particular aid in district offices of the Federal Housing Administration which will now be able to approve installations of styrene wall tiles that conform to the new commercial standard. A hallmark has also been included and may be used by the manufacturer to indicate his compliance with the standard.

Laminating Plant

PRODUCTION of decorative laminate by the Panelyte Div., St. Regis Paper Co., will reach capacity levels in the new plant in Kalamazoo, Mich., by September, according to C. Russell Mahaney, vice president. The plant represents an investment of $5 million and will add approximately 50% to the productive capacity of the division. The plant supplements output of the company's major facilities at Trenton, N. J. Moving the manufacture of decorative and part of the molded Panelyte operation to the Kalamazoo plant will permit increased production at Trenton of industrial Panelyte—that is, sheets, rods, tubes, molded forms, and fabricated parts manufactured to customers' designs.

The company has also announced its entrance into injection-molding, post-forming, and low-pressure molding fields. Another plant, also under construction at St. Johns, Quebec, will supply the Canadian market for refrigeration, industrial and decorative Panelyte.

High-Impact Phenolics

THREE new phenolic molding compounds of the impact type have been placed on the market by Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y. Durez 13537 Natural and Durez 14482 Black are both high-impact, fabric-filled materials which are said to have improved flow properties and finish and to be less critical when electronically preheated. The black is similar to the natural in nearly all properties but has almost double the impact strength.

Durez 14658 has the moldability of general-purpose materials but, because of its nitrile rubber content, it possesses improved impact strength and shock resistance. It is particularly useful in thin sections around metal inserts. The material can be plunger or compression molded and has very good surface appearance.

Taunton, Mass., Plastics Plant

A MILLION-DOLLAR improvement plan to make the Taunton, Mass., plant of its plastics division one of the largest plastics operations in the country has been announced by Herbert Brusman, manager of the Plastics Div., General Electric Co. The plant is scheduled for completion about the end of 1950. Interior sections of the plant will be altered, and new presses added.

The manufacture of all molds used in plastics production at Taunton and at Decatur, Ill., will be consolidated in an enlarged tool room at Pittsfield, Mass. The transfer of molding equipment to Taunton will make room at Pittsfield for expansion of several chemical manufacturing activities such as silicone rubber and other plastics resins.

S.P.E. National Conference

THEME of the Seventh Annual National Technical Conference of the Society of Plastics Engineers, Inc., will be "Plastics Shape the Future." The conference will be held Jan. 18 to 20, 1951 at the Hotel Statler, New York, N. Y. Following this theme, the technical papers to be presented at the conference will review achievements in plastics during the past 50 years, and prophesy the course of developments during the coming half-century in plastic materials, machinery, processing methods, and applications.

The conference is being sponsored jointly by the New York and Newark Sections of the Society which have set up a committee to handle all arrangements. James T. Growley, Celanese Corp. of America, and Stanley Bindman, Gemloid Corp., are co-chairmen of this committee; William M. Preston, Koppers Co., Inc., is secretary; William Lewi, Dusal Tool & Mold Co., treasurer.

Largest Injection Press

A GIANT machine capable of producing thermoplastic products approximately 200 oz. in weight was unveiled at the plant of A. L. Hyde, Grenlock, N. J. recently, where New Jersey's Governor Alfred E. Driscoll made the principal address.

The press, manufactured by Watson-Stillman Co. of Roselle, N. J., weighs 115,000 lb. and is operated by a 60-H.P. motor. It is 24 ft. 8 in. long, 5 ft. wide, and 12 ft. 11 in. high. The size of the platens is 60 by 40 in., and there is a 54-in. daylight opening. The hopper holds 300 lb. of plastic raw materials, the clamping capacity is 1000 tons, and the maximum injection pressure is 21,000 p.s.i.

$30 Million Expansion

AN expansion program involving expenditure of $30 million has been announced by The Dow Chemical Co. The new program will be part of the company's Texas Div. operations and will include facilities for the production of ethylene, chlorine, styrene, glycols, vinyl chloride and vinylidene chloride. Construction is expected to start in the very near future.

COMPANY NOTES

Hercules Powder Co., Cellulose Products Dept., has announced that **Robert E. Steeper** has been transferred to the home office in Wilmington, Del., to work on sales development of new cellulose products. **Harold Jenkins** has joined the development group at Hopewell, Va.

The Goodyear Tire & Rubber Co. has announced that **John F. Chartier** has been transferred from New York to the company's home offices at Akron to join the vinyl film sales organization.

Ferro Chemical Corp., Bedford, Ohio, has announced the appointment of **Van Waters & Rogers, Inc.**, as sales agent for the Northwest territory.

Halocarbon Products Corp., 2012-88th St., North Bergen, N. J., has announced the quantity production

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of stabilized low polymers of chlorotrifluoroethylene in the form of oils, greases, and waxes. Called Halocarbons, they are used as softeners for chlorofluorocarbon plastics in molding and coating operations.

International Molded Plastics, Inc., 4387 W. 35th St., Cleveland 9, Ohio, has announced that **A. Edward Campi**, formerly with **American Cyanamid Co.**, is now its plant manager. **Willard D. Martin** is chief engineer.

Pantasote Co. has purchased new machinery as part of an expansion plan expected to increase the company's sales to $8 million a year from the current average of $5 million a year, or an increase of 60%. The new equipment, expected to be in operation late this year or early in 1951, will permit production of film up to 75 in. wide.

Extruded Plastics, Inc., New Canaan Ave., Norwalk, Conn., formerly a custom extruder, is now specializing in acetate and butyrate tubing and containers on a proprietary basis under the trade name of Tulox. The transparent containers, said to be non-shatterable, are available in a wide variety of sizes and shapes ranging from ¾ in. to 2 in. in diameter, and are used for packaging such items as tooth brushes, hardware, and ball bearings.

Plax Corp. has added 20,000 sq. ft. of production space by moving its headquarters, sales, and accounting offices to 450 Asylum St., Hartford, Conn., and its engineering and research departments to 411 Homestead Ave., Hartford. The company's mailing address remains the same: P. O. Box 1019, Hartford 1, Conn.

Monsanto Chemical Co., Springfield, Mass., has announced the appointment of **Donald J. Miller** as manager of the company's new styrene plant at Long Beach, Calif., and **Joseph R. McCleskey, Jr.**, as plant supervisor of that plant.

Farrel-Birmingham Co., Inc., Ansonia, Conn., has announced the appointment of **Carl F. Schnuck** as director of engineering, and **Warren C. Whittum** as chief engineer.

St. George Textile Corp., 119 W. 40th St., New York 18, N. Y., has announced the establishment of an Industrial Fabrics Div. and the appointment of **Jack P. Schwebel** as head of that department. The new division will specialize in weaving of glass, plastic, nylon, and other synthetic fabrics for use primarily in the electrical, plastics, aircraft, rubber, and automotive fields.

Textileather Corp., Toledo, Ohio, reports that sales for the first four months of 1950 were 20% above the same period last year.

J. W. Jenkins Co., Inc., 2158 Front St., Cuyahoga Falls, Ohio, has been formed for the purpose of dealing in surplus lots of virgin plastic and reground and scrap thermoplastic raw materials. **James W. Jenkins** is president and **Daniel F. Retzer** is treasurer.

United States Rubber Co. has named **Bernhard N. Larsen** as development engineer and technical service representative for rubber chemicals in the Naugatuck Chemical Div. **J. A. Herring** has been appointed technical sales representative for Marvinol vinyl resins in the New York area.

General Electric Co. has announced that the phenolic varnishes and liquid resins manufactured at its Coshocton, Ohio, plant are now available to users outside the company. The materials have been used in manufacturing G-E laminated plastics, and the plant is now producing phenolic liquid resins for use by outside customers as foundry sand core binders and as rock and glass wool binders.

Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y., reported in the current *Metco News*, the company's official organ, the case history of a large plastics-processing company that stopped corrosion with metallizing. Operating 400 hydraulic presses with 424 rams, this metallizing user states that "some of these rams may last as long as 10 years before recoating is necessary."

The Jason Corp., Hoboken, N. J., manufacturer of Sealtuft quilted plastic, has appointed **The Leathercraft Corp.**, 33 E. 21st St., New York, N. Y. as agent.

The Watertown Mfg. Co., Watertown, Conn., announces the acquisition of the physical assets of **Moulded Metals Co., Inc.**, also of Watertown. Existing facilities of the powdered metallurgy division have been augmented.

Creative Plastics Corp. has announced that its principal office will be located in the new factory building at Stony Brook, Long Island, N. Y. Sales offices will remain in the Chrysler Building, New York 17, N. Y.

American Cyanamid Co., Plastics & Resins Div., 30 Rockefeller Plaza, New York, N. Y., has announced a price reduction of 3¢ per lb. for Melmac Molding Compounds 1077 and 1079.

United States Gasket Co., Camden, N. J., has appointed **W. S. Shamban & Co.**, Los Angeles, Calif., as exclusive representative in California for the company's complete line of gaskets, including Chemiseal Teflon products.

Acheson Colloids Corp., Port Huron, Mich., has announced that its new plant for the production of dispersed pigments will be ready for occupancy this August.

The Dow Chemical Co., Midland, Mich., has named **D. W. McCraig** as plastics molding powder salesman for the Cleveland territory, succeeding **A. W. Butterworth** who has been transferred to Philadelphia. **James C. Tobin** has been assigned to the Chicago area.

Ranger-Tennere, Inc. has announced the discontinuance of all operations in the plastics field, but **Saul Optner**, who has been vice president in charge of production for Ranger-Tennere, has formed **Plastic Service Corp.** which will be active in the fields of press polishing and embossing. Although operating at the same address, 318 E. 32nd St., New York, N. Y., Mr. Optner says there is no connection between

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these two companies except that the services of the principals will be available on a consultation basis with regard to the technical problems of the plastics industry.

Anchor Plastics Co., pioneer extruder of plastics materials, has increased its operating space by taking over another floor in its present quarters at 533 Canal St., New York, N. Y. The company now occupies five floors of the premises.

E. I. du Pont de Nemours & Co., Inc., Polychemicals Dept., has announced the following personnel assignments in the **Polychemicals Dept.** Formation of new production and sales divisions of the department were announced by Dr. E. D. Ries, general manager. The divisions were formed by the integration of plastics sales and production organizations with those of the chemicals organization of the department. New appointments are: **C. H. Doherty, Jr.**, production and sales division head; **E. R. Habicht**, manager, operating section; **Dr. R. M. Evans**, manager, technical section; **E. F. Schumacher**, director, sales division; **Dr. H. R. Dittmar** and **L. B. Gillie**, assistant directors; **E. J. Pechin**, director, plastic sales division; **P. W. Crane**, manager, sales development and technical service; **Dr. John S. Beekley**, chemical director; **Dr. Frank C. McGrew** and **Lombard Squires**, assistant chemical directors.

Atlantic Plastics, Inc., formerly of Flushing, L. I., has moved its plant to new facilities at 60 Bonner St., Stamford, Conn.

PERSONNEL

Edward H. Decker has joined the **Industrial Fabrics Div., Hess, Goldsmith & Co., Inc.**, New York, N. Y., specializing in the sales and development of Fiberglas and other synthetic industrial fabrics. For the past six years he was associated with **Owens-Corning Fiberglas Corp.**

Harry Wilson has been appointed manager of the casein department of **Borden Co.'s Chemical Div.**, succeeding **George Smullen.**

Frank Gimblette has joined the manufacturing headquarters staff of **General Electric Co.'s Plastics Div. Thomas H. Way** succeeds him as manager of the company's Taunton, Mass., plant. **Mr. Gimblette** has been with the company since 1920.

Gene Rankin has been named sales representative in the Kansas City area for **Synthane Corp.**, Oaks, Pa.

Robert Baldwin has joined **Gemloid Corp.**, Elmhurst, N. Y., in the capacity of superintendent of the injection molding department. He was formerly with **Queen City Injection Molding Co.**

D. W. Biklen has joined **Orangeburg Mfg. Co., Inc.**, Orangeburg, N. Y., as a product development engineer. He was formerly associated with **DeBell & Richardson, Inc.**

Paul F. Preston has been named manufacturing manager of the **General Electric Co.'s Chemical Dept.** He joined the firm in 1949. It has also been announced that **William L. Rodich** has been named manufacturing manager of the Chemical Dept.'s **Chemical Division.**

Luke A. Cermola has been appointed New England district manager of **Plax Corp.**, Hartford, Conn.

Dr. Arthur E. Brooks has been appointed manager of **United States Rubber Co.'s** general laboratories at Passaic, N. J. He has been with the company since 1929.

Melvin L. Bunting has been named a technical service engineer of **Acheson Colloids Corp.**, Port Huron, Mich. He was formerly with the **U. S. Gypsum Co.**, Detroit.

Robert E. Randall has been named assistant production manager of **Rowland Products, Inc.**, Kensington, Conn., manufacturer of cellulose nitrate sheets. He was formerly with **Monsanto Chemical Co.** in Springfield, Mass.

Richard W. Halverson has been appointed superintendent of **Industrial Plastics Corp.**, Elkhart, Ind. He was formerly with **Polyform Plastics,** New York, N. Y.

Wilbur L. Vega has been named eastern district sales manager for the packaging division of **U. S. Fiber & Plastics Corp.**, Stirling, N. J.

F. G. Berlin has been elected president of **The Plas-Tex Corp.**, 2525 Military Ave., Los Angeles, Calif. He joined the company three years ago as sales manager.

Sid Bersudsky has been elected president of the **Association of Canadian Industrial Designers,** 55 Metcalfe St., Ottawa, Canada.

William Hoyt has resigned as director of engineering with the **American Insulator Corp.**, New Freedom, Pa., and has returned as a laboratory director to **International Business Machines,** Endicott, N. Y., where he was previously employed after serving as a plastics technician in the Bureau of Aeronautics in the Navy Department during the war.

Deceased

Julius Muehlstein, treasurer and director of **H. Muehlstein & Co., Inc.**, 122 East 42nd St., New York 17, N. Y., died recently after a long illness. He was 59 years of age.

MEETINGS

July 22-27—New York Curtain and Drapery Show, New York.

Aug. 7-20—United States International Trade Fair, Merchandise Mart, Chicago, Ill.

Aug. 28-31—American Mining Congress Metal Mining Convention and Exposition, State Fair Grounds, Salt Lake City, Utah.

Sept. 5-9—Chicago Section of the American Chemical Society, Sixth National Chemical Exposition, Chicago Coliseum, Chicago, Ill.

Sept. 10-13—American Institute of Chemical Engineers, Regional Meeting, Radisson Hotel, Minneapolis, Minn.

Oct. 18-20—S.P.I. Annual National Conference, New Ocean House, Swampscott, Mass.

Oct. 24—Association of Consulting Chemists and Chemical Engineers, Annual Meeting, Hotel Shelburne, New York, N. Y.

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FOR SALE: 100 Ton and 150 Ton Stokes Molding Press & Pumps; 200 Ton H. P. M. Self Contained Molding Press; 300 Ton Dunning & Boschert, Molding Press; 300 Ton W. S. New Hobbing Press; 300 Ton W. S. Press 24 x 20 Platens; 175 Ton H. P. M. 30 x 30 Platens; 85 Ton Stewart Bailing 30 x 20 Platens With Electric Plates; 50 Ton 18" x 18" Elmes, With Electric Plates, Handpump Operated; 500 Ton Waterbury Farrel 3 Post Press; 800 Ton Waterbury Farrel 23" x 24" Platens; Watson-Stillman 75 Ton 15" x 15" Platens; 100 Ton W.S. 16" x 18" Self Contained Press; Carver & Watson Stillman Lab. Presses; Hydro Pneumatic & other type Accumulators; Piston & Oil Pumps. AARON MACHINERY CO., 45 Crosby St., N.Y.C.

FOR SALE: 1 oz. Van Dorn injection molding machine late 1947; Farell 18" x 45", 16" x 48" & 15" x 36", 2 roll rubber mills. New 6" x 12" Lab. mixing mills & calenders. Other sizes 30" to 84". Royle #2 perfected extruder, and other sizes. 500 ton Hydr. molding press 42" x 48". Field 500 ton 28" x 30". 200 ton F.B. Hydr. Molding Press 40" x 32"; 300 ton D & B Molding Press 36" x 36". Francis 175 tons 24" x 18". W.S 115 ton 2 opening 24" x 24". 40 ton broaching press. Also presses 20 to 800 tons from 12" x 12" to 36" x 36". Record Presses. Hydr. oil pumps, Vickers, Oilgear, Northern, etc. Watson Stillman hor 4 plgr. 1¾" & 2½" x 4" H & L pressure pump. HPM 1—¾" x 6" vertical triplex 10 GPM 2700 lbs. Elmes 1" x 4" & 1—¼" x 4" hor. 4 plgr. 5 & 8 GPM 4500 lbs. & 5500 lbs. Elmes 2" x 6" Horiz. 30 GPM 2500 psi. Rumsey 4½" x 8" vert. triplex 65 GPM 900 lbs. Hydr. steam pumps. Low pressure pumps 150 to 600 lbs. Hydr. accumulators. Stokes automatic molding presses. Colton #4½ single punch preform tablet machine 1½" dia. Stokes rotary preform tablet machines 1—3/16", 1—⅝" and ⅝", also single punch. Injection molding machines 2 oz. to 16 oz. Baker Perkins jacketed mixers 200, 100, 50, and 9 gals. capacity. Leominster 5 hp. plastic grinder. New and used rotary cutters. #18H Mikro pulverizers, & other sizes. Rubber mills, calenders, #00 Banbury mixer, etc. Heavy duty mixers, grinders, pulverizers, gas boilers, etc. Partial listing. We buy your surplus machinery. Stein Equipment Co., 90 West St., N. Y. 6, N. Y. WOrth 2-5745.

HYDRAULIC PRESSES REBUILT TO SPECIFICATIONS for plastic items, industrial purposes and phonograph record presses. We have in the used equipment (1) Baldwin-Southward 8" x 8' stroke, 2000# W. P. weighted accumulator $2000, (1) 400 ton, 32 x 45, 18" ram, 36" stroke, 12' daylight $2200 (1) 300 ton 30 x 46, 18" ram, 24" stroke, $1500, (1) 400 ton 22 x 30, 16" ram, 18" stroke, 36" daylight $1500, (2) 150 ton 42 x 46, 12" ram, 30" stroke, 60" daylight $900 each, (6) 250 ton 32 x 66 12" double ram, 48" daylight, 18" stroke, flange type packing $1850 each. Hydraulic Sal-Press Co., Inc., 386-390 Warren Street, Brooklyn 2, New York.

HYDRAULIC PRESS—700 Ton Capacity. Nearly new, with 4 ft. by 6 ft. multi-steam platens. Suitable for manufacture of plastics, pressed wood products, and metals. Also all necessary equipment for making 4 by 6 ft. wall panels of sawdust. For complete details, write: MIDWEST BUY ANYTHING CO., 1520 Locust St., Kansas City, Mo.

FOR SALE: B&J #1 Cutter; Lab. Size double arm Jktd. Mixer. Also 25 gal., 100 gal. and 150 gal. Dbl. arm mixers. Perry Equipment Corp., 1529 W. Thompson St., Phila., 21, Pa.

FOR SALE: Injection Presses: 2 & 6 oz. Reeds, 2 & 4 oz. HPM, 8 oz. Watson, 2 oz. DeMattia. 1 oz. vert. bench NRM, 1 oz. VanDorn. Extruders: NRM Lab bench unit, 1½" & 2½" oil heat. NRM. 3½" dbl. ext. Royle oil heatd.—Ovens, Granulators, Tumbling barrels, Temper. Circulators. Apex rd obj. Printg. Mach. 1—HPM 9 oz. Hastelloy Heat. Chamber.—2—Electronic HF Generators & Sealers f.Vinyls.—300 ton Watson Stillm. Compress. press complete. 1—150 ton Stokes mod. 252 autom. Closure press.—1—Stokes mod. 258 semi autom. 50 tons Press. 1—Laminat. Press mult. op. 30x60" .1—Kux No. 25 rotary & 1—Stokes No. 280C Preformpresses. 1—Northrop 6 stat. Micromax Temp. control Recorder. 1—Eclipse 3HP gas boiler. Justin Zenner, 823 W Waveland Ave., Chicago 13, Ill.

FOR SALE: Stainless Steel Rotary Digester, mfg. by A. O. Smith Corp. 10' dia. x 5'9" long with 4'6" long cone ends. Shell designed to withstand alternately an internal pressure and temperature corresponding to 75# p.s.i.g. steam, 15# external pressure. A.S.M.E. code construction. Complete with all accessories including Philadelphia Moto-Reducer with 25 HP explosion proof motor. Cutler Hammer torque motor operated brake, Philadelphia heavy duty worm gear speed reduction unit, fast flexible coupling, etc.
Stainless Steel Briquetting Roll Press, mfr. by Komarek-Greaves Co. Stainless press rolls 16" dia. Complete with all accessories including Stainless Steel Screw feeder with 5 HP explosion proof motor, and variable speed transmission, 20 HP explosion proof motor, and variable speed transmission, 20 HP explosion proof motor press roll drive, etc. Gelb & Company of Scranton, Richmond & Norris Streets, Philadelphia 25, Pa. Telephone—NEbraska 4-2041.

STOKES PREFORMING PRESS, TOGGLE TYPE: #280B—top pressure only; 80 tons; two inch fill; four inch diameter preform; variable speed drive for AC; 220/440 volts, 60 cycle, three phase; purchased Oct. 16, 1942; Price $4,500.00, F.O.B. Chicago.
STOKES PREFORMING PRESS, TOGGLE TYPE: #280—top pressure only; 80 tons; two inch fill; variable speed drive for AC; 220 volts, 60 cycles, three phase. Purchased Oct. 15, 1934, Price $2200.00, F.O.B. Chicago.
FOUR OUNCE HPM MOLDING MACHINE: Serial #22138; pressure capacity, 100 tons; line or gage pressure, 2550 lbs.; maximum ram travel, 12 inches. Motor: Frame 3652, Type K; Model 5K-365-A-64; full load amps., 38.4 or 19.2; speed under full load, 1165; horsepower, 15. Purchased Oct. 1939. Price, $4500.00, F.O.B. Chicago. Box 633, Modern Plastics.

FOR SALE: 6 oz. and 8 oz. Lester Injection Molding Machines perfect condition, one or two years old. State offers. Box 636, Modern Plastics.

FOR SALE: One 5 HP-200 lbs. pressure Eclipse steam boiler. Gas fired. Complete with low water cut off, injector and other fittings. One speedyelectric steam boiler. Model 632 200 lbs. pressure. All boilers in good condition. Reply box 647, Modern Plastics.

FOR SALE: Complete wood flour mill. Capacity 10 tons per 24 hours, using nearby supply of pine and poplar. For further particulars address Box 629, Modern Plastics.

Machinery and Equipment WANTED

WANTED: Complete plants, also individual items such as: Mixers, grinders, 2-roll mills, extruders, etc. Reply Box 617, Modern Plastics.

We have a problem in the hand cleaning and washing of large molded polystyrene pieces, approx. 12" x 12". We are interested in an efficient and automatic cleaning device or method to replace the hand operation. If you have a solution to our problem please contact us through Box 618, Modern Plastics, for further details.

New manufacturer wants injection molding machines, also extruding equipment. Will pay good prices. Reply Box 620, Modern Plastics.

WANTED: 2½" & 6" plastic extruders—8 oz. to 12 oz. Reed Prentice—2 & 5 H.P. grinders—lab mill—60" mill. SEND COMPLETE DETAILS TO BOX 630, Modern Plastics.

WANTED: Hydraulic Steam Platen Press for plastic lamination and press polishing, minimum three openings, 58" x 102", 500 PSI on work, with equipment. Submit full details, make of press, etc. Reply Box 646, Modern Plastics.

Injection molding plant located in New York. Write stating facilities in full detail. Will also consider buying fairly new 8 ounce machines. All replies in strict confidence. Box 627, Modern Plastics.

WANTED: Extruder, 1½", Electric or Oil Heating. State Make, Price, age and use. Reply Box 637, Modern Plastics.

WANTED: Grinder, Chopper or Granulating machine to be used for preparing Sprue Gates and rejected plastic pieces for re-use in an injection molding machine. Reply A. L. I. Mfg. Company, Hartington, Nebraska.

WANTED: 2 H.P. Bench Grinders Cumberland # 0 or similar. Must be in good condition. Robinson Plastics Corp. 14 Grand St., N. Y.

Materials Wanted

WANTED: PLASTIC Scrap or Rejects in any form. Acetate, Butyrate, Polystyrene, Acrylic, Vinyl Polyethylene, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding, magnetizing and compounding. Reply Box 619, Modern Plastics.

(Continued on page 172)

VISIBILITY

by Swedlow

F94 Lockheed's new jet fighter for U. S. A. F. is designed to fly and fight in pitch darkness, with high-altitude interception of enemy aircraft as its principal function. For quality and dependability, a SWEDLOW produced acrylic enclosure was selected to protect the pilots and navigators of this latest Lockheed contribution to the American aircraft industry.

15 YEARS OF PIONEERING IN ACRYLICS... RECOGNIZED SPECIALIZATION IN AIRCRAFT

...plus perfection in optical properties...these are factors in making SWEDLOW a part of many notable developments in the aircraft industry.

We shall be glad to assign a staff engineer to work with you in any applications in industry using glazing materials.

We also serve the industry with improved fuel cell backings in accordance with applicable Air Force, Navy and customer specifications.

Among other leading aircraft companies in whose latest achievements SWEDLOW skill in acrylics had a share are . . . . .

- **Boeing Airplane Company**
- **Consolidated Vultee Aircraft Corp.**
- **Hiller Helicopters, Inc.**
- **McDonnell Aircraft Corp.**
- **North American Aviation.**
- **Northrop Aircraft, Inc.**

Swedlow PLASTICS CO.

CLASSIFIED ADVERTISING

(*Continued from page 170*)

WANTED: PLASTIC SCRAP or REJECTS in any form: Cellulose Acetate, Butyrate, Polyethylene, Polystyrene, Vinyl, Acrylic and Ethyle Cellulose. Reply Box 621, Modern Plastics.

"We buy "Old UREA" molding compound or odd colors
Box 143, Arverne, New York

Required: ethyl cellulose molding material, any form, any color, any quantity. Top prices for usable material. Please send sample and price to Box 634, Modern Plastics.

Molds Wanted

European Manufacturer seeks molds of successful American lines (pref toys). Will purchase, short hire or royalty basis. Reply with samples of product to Dandoy-Van De Waal, Rue Zérézo, 17 Brussels, Belgium.

WANTED: Used or new molds for all kinds of novelties, household appliances, barretts, side combs for two ounce capacity Van Dorn plastic injection press. Will consider whatever you have. Please send samples and description to H. Farahnik, 401 Broadway, New York, New York. Tel. # Canal 6-7414.

Molds For Sale

ACTIVE DIES FOR SALES

Mail Box dies complete for phenolic material. Excellent condition. Injection three-inch house number mold also available. Reply Box 632, Modern Plastics.

Help Wanted

WANTED: Technical sales representative with engineering degree and well rounded experience in plastics. Territory covers Eastern Seaboard from Philadelphia through New England. Excellent opportunity with the plastics division of an old line company. Please give pertinent personal data, including desired salary. Replies will be held in confidence. Reply Box 643, Modern Plastics.

Sales representation in upper New York State wanted by large Midwest moulder of thermosetting plastics. Reply Box 622, Modern Plastics.

Plastic Engineer—Injection Molding—who knows mold Construction and Value. Good knowledge of capable mold sources—East and Middle West. Our Personnel know of this ad. Write Box 635, Modern Plastics.

Foreman and manager to take complete charge small injection molding plant in New York, State previous experience and salary expected. Good opportunity. Replies strictly confidential. Box 628, Modern Plastics.

Wanted: Sales Representative: Chicago area, to solicit custom business for laminated plastic scales, name plates, dials, schematic drawings, and formed parts. This service a "natural" for man already selling molded and extruded services. Straight commission basis. Send full qualifications. Reply Box 625, Modern Plastics.

INJECTION PLANT MANAGER: For progressive Michigan molder with 12 machines. Only man thoroughly familiar with injection machines and experienced in production management and cost estimating considered. Attractive proposition for right man. Write complete details to Box 644, Modern Plastics.

Plastic Sales Representatives Wanted For Large Injection Molder in New York City. Must Be Experienced in Field With Good Following. Draw Against Commission. Reply Box 624, Modern Plastics.

MECHANICAL ENGINEER: experienced in plastics injection molding. Complete knowledge of mold designing and modern production methods. Excellent opportunity with well established injection molder in northern New Jersey. Submit resume. All replies kept confidential. Reply Box 631, Modern Plastics.

SALES REPRESENTATIVE, commission basis, wanted by large eastern molder for the following areas:
Philadelphia, Pa. and vicinity.
Boston, Mass. and vicinity.
Upper New York State.
State of Ohio.
Please reply Box 645, Modern Plastics.

Plastics Research Manager—Manufacturer of flexible extruded shapes requires a man with extensive experience in formulations and extruding processes of all types of flexible plastic extrusions. Please send complete resumé together with salary desired. Reply Box 638, Modern Plastics.

Phenolic Resin Chemist, with practical production experience in liquid and molding powder resins and compounds. Plant in metropolitan area (New Jersey). State experience and salary requirements. Permanent position. Reply Box 639, Modern Plastics.

Situations Wanted

PLASTIC ENGINEER: Tool and Die design; Plant and job setups. Injection and extrusion molding; all shapes and sizes. Polythene sheeting .001-005 inches. Flat or tubular Dies. Available Now. Reply Box 623, Modern Plastics.

PLASTIC FOREMAN and Supervisor, compression molding. 12 years practical experience and plant setup from the raw material to the finished product. Maintenance, inventory and production control; time study. Age 38 and married. A1 references. Reply Box 640, Modern Plastics.

MERCHANDISER PLASTIC CONSUMER PRODUCTS: Extensive background in market research and new products development in plastics with large midwest organization. Widely experienced in chain, jobbing and premium marketing in which activities now engaged in substantial way but seek change for personal reasons. Will locate anywhere. Reply in confidence to Box 641, Modern Plastics.

Miscellaneous

FOR SALE
Modern well designed injection molding plant with small mold shop. Conveniently located in the Metropolitan New York area. Line consists of Housewares, Toys and Novelties. Ready and good going business with factory equipment and propriety molds in excellent condition. Additional battery of machines can be installed in plant consisting of 28,000 square feet. In good labor market. Low rental. Reply Box 163-M, 217 7th Ave., New York 11, N. Y.

PLASTICS CONSULTING ENGINEER, working with molders and tool-shops in the Chicago area, is interested in representing a product, material, or service, of merit to this industry. Can give such an item excellent technical and sales service. Reply Box 626, Modern Plastics.

ATTENTION
MANUFACTURERS!!!
Year of experience selling chains and wholesalers. If it's business you want, contact:
ALLEN SALES COMPANY
366 Broadway, New York 13, New York

FOR SALE: Philadelphia—two story and basement brick factory or warehouse building with one story addition—3 street fronts—ground area contains in excess of 30,000 sq. ft. Slow burning construction—120 lb. floor load—wet sprinklered—low pressure steam boiler oil fired—conveyor from 1st to 2nd floor. One story addition has 20' ceiling heighth. Electrical system—200 KVA. capacity—2400 volt primary—240/120 volt, 60 cycle, secondary. Sub-main feeders, three phase, 240 volt throughout plant. For further particulars consult CLARK W. COLEMAN & CO., 1616 Walnut Street, Philadelphia, Pa.

Patent now pending on useful plastic article for the kitchen and dining room. Should retail for thirty cents. Since there has always been a demand for an item of this nature the sales possibilities should be enormous. Will require large manufacturing plant to handle. Article available on royalty basis. Address Guy M. Hamilton, 1654 North Decatur Road N. E., Atlanta, Ga.

NEW PRODUCTS CAN INCREASE YOUR VOLUME OF BUSINESS

Designer-Executive has a 15 year outstanding record of New Product Development in Housewares, Giftwares, Plastics, Toys, Juvenile Fields. He is looking for a progressive concern desiring to double its volume of business by an aggressive program of New Product Design & Development.

Reply Box 642, Modern Plastics

All classified advertisements payable in advance of publication

Up to 60 words $7.50	Up to 120 words $15.00	Up to 180 words $22.50
Up to 60 words (boxed) $15.00	Up to 120 words (boxed)....$30.00	Up to 180 words (boxed)....$45.00

For further information address Classified Advertising Department, Modern Plastics, 122 E. 42nd St., N. Y. 17, N.Y.

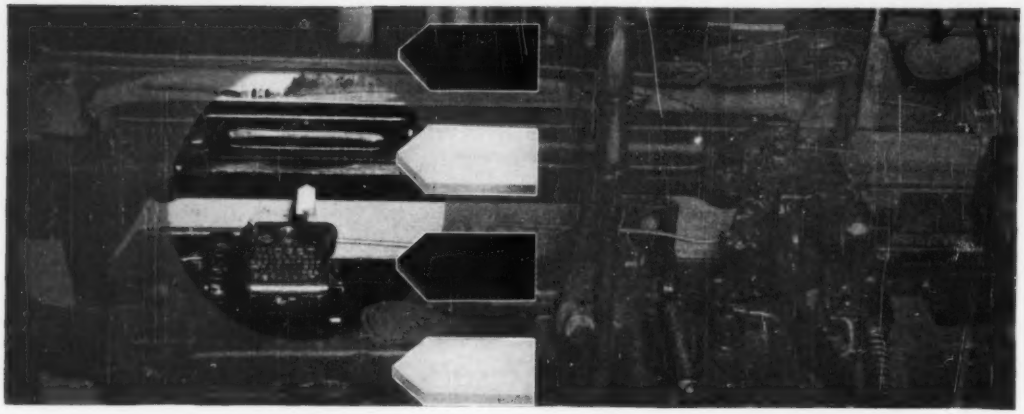
INDEX OF ADVERTISERS

AUGUST 1950

MODERN PLASTICS

122 EAST 42nd STREET • NEW YORK 17, N. Y.

Courtesy the Draper Corporation, Hopedale, Massachusetts



a tip that paid off

THE small but extremely important Feeler Tip on a Draper Loom takes its place on the long list of plastic parts and products we have *custom-made* and therefore *quality-made* for scores of manufacturers.

Precision moulded both of nylon and of butyrate, these new economical tips out-perform all of their predecessors both functionally and in long, trouble-free operation. Hour after hour they dart in and out of the shuttle, ready to signal an automatic loom stop should the yarn or thread run dangerously low. Regardless of coarse, abrasive-acting yarn or the finest thread, they hold their shape without cracking, chipping or breaking.

Take a tip from Worcester Moulded Plastics. Let us offer you a *custom-made* plastics solution to some problem of yours.

Custom Injection Moulding

WORCESTER MOULDED PLASTICS CO.

14 HYGEIA STREET, WORCESTER 8, MASS.

17 East 42nd St., New York 17, N. Y.

There's a place for you at this banquet of profitable products!

YOUR PRODUCT can join this select company of products made better, more profitable, because they're made of VINYLITE Brand Plastic flexible molding and extrusion compounds.

Here's how to go about it. Make a check list of your requirements then ask yourself these questions. Do you need:

Flexibility? VINYLITE Plastic flexible compounds are available in varying degrees of flexibility from soft and rubbery to semi-rigid. They withstand long flexing without cracking.

Attractive appearance? These materials are available in the widest possible range of color from the palest pastels to deepest colors in the spectrum.

Long wearing service? These compounds are non-fading . . . resist abrasion . . . give longer wear than any of the older elastomeric materials.

Resistance to oils, chemicals? VINYLITE Plastics are highly resistant to oils, greases, acids and alkalis.

High speed production? VINYLITE Plastic flexible compounds are easily fabricated by injection molding. They are extruded with equal facility.

This unique combination of properties may play a big role in your future success. Drop a line to Dept. IZ-7 for further information about these versatile materials. You'll find us most cooperative in helping you work out your particular application.

Vinylite BRAND **PLASTICS**

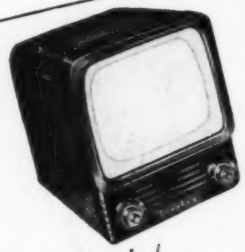
BAKELITE DIVISION

UCC

BAKELITE DIVISION, *Union Carbide and Carbon Corporation,* 30 East 42nd Street, New York 17, N. Y.

Now you can get . . .

● QUICK DELIVERY ● LOW COSTS
● TREMENDOUS PRODUCTION CAPACITY
on PLASTICS MOLDED jobs like these



Big jobs! Giant presses at G.E.'s Decatur plant can turn out large parts like this television cabinet every few minutes.

Large-volume jobs!

G.E. molded major parts for Argus cameras—hundreds of thousands of which have been sold.

High-quality jobs!

This G-E molded plastics juicer bowl is practically unbreakable, attractive, and easy-to-clean.

● Expanded plant capacity makes it possible for General Electric to offer important advantages to big-volume users of plastics parts. Modern G-E factories in the Midwest and the East are equipped with the latest—and largest—plastics molding equipment. G-E plastics "know-how" and experience can show you how to cut your costs. General Electric's tremendous production capacity means fast delivery, even on large-volume jobs involving big parts.

Find out how this unique plastics service can work FOR YOU.

Let us show you how G-E plastics engineering can reduce your costs, improve your product. Write for information to Plastics Division, Chemical Department Y1, General Electric Co., Pittsfield, Mass. Let us send you, free, the informative illustrated booklet, **"Your Plastics Dollars Worth."**

Well-engineered jobs!

G.E. molded this part in one piece, where several parts and costly assembly were required before.

GENERAL ELECTRIC